



## **INDEX**

- 1.0 Installer Conduct and Safety Overview**
- 2.0 Basic Satellite Fundamentals**
- 3.0 Cable and Connector Standards**
- 4.0 Site Survey**
- 5.0 Dish Assembly and Mounting**
- 6.0 Dish Alignment and Signal Tuning**
- 7.0 Wiring – External**
- 8.0 Wiring – Internal**
- 9.0 Telco IPPV Connection**
- 10.0 System Grounding**
- 11.0 Disconnect Procedures**
- 12.0 Troubleshooting Tips**
- 13.0 Customer Education and Home Set-Up**
- 14.0 Approved Parts List**
- 15.0 Legacy Equipment Tips**
- 16.0 Documentation**
- 17.0 Work Codes**
- 18.0 Plex Construction**
- 19.0 Marketing and Sales Promotions**
- 20.0 Technical Bulletins**



# ***Installer Conduct and Safety Overview***

Issued 5/12/02



## **INSTALLATION HANDBOOK**

### **1.0**

### **INSTALLER'S "CODE of CONDUCT" and SAFETY OVERVIEW**



# ***Basic Satellite Fundamentals***

Issued 5/12/02



## **INSTALLATION HANDBOOK**

**2.0**

**BASIC SATELLITE FUNAMENTALS**

**for**

**THE INSTALLER**



# Basic Satellite Fundamentals

Issued 5/12/02

## BACKGROUND INFORMATION ONLY

### 2.1 TELEVISION BACKGROUND

Since the invention of television in the early 1940s several methods have been developed to bring the news, sports and other forms of entertainment to the consumers. At first, over-the-air VHF channels, the familiar 2 to 12 channels, and then the higher frequency channels in the UHF frequency Band were the only choices.

Cable television (CATV) began its evolution in the early 1950s with systems designed to bring over-the-air programming to consumers homes via a distribution system cabled directly to each subscriber's home. CATV reached maturity in the 1980s with the creation of up-linking major Networks for delivery via satellite to cable networks.

Ironically, satellite communications that was the driving force behind the rapid growth and evolution of cable TV, became the spawning ground of the home TVRO (television receive only) industry characterized by the familiar "dish" antenna ranging in size from 5 to 10 feet. These systems were often referred to as "C" Band systems and most operated in the 4 GHz frequency Band.

Also, as early as 1971 wireless TV (single channel service) was introduced known as Multipoint Distribution Service (MDS) that evolved into Multichannel Multipoint Distribution Service (MMDS) by the early 1980s. These services operated in the 2.5 GHz frequency Band and were line-of-sight systems with a range of approx. 30 Km.

As digital compression technologies evolved the new comer to providing television entertainment to consumers evolved in the mid 1990s with a fixed dish system known as Direct-to-Home Satellite Television (DTH).

In 1997, Canada moved into the DTH service with the introduction of AlphaStar that lasted approx. 4 months. Coincident with AlphaStar, Star Choice Communications Inc. became the only Canadian DTH service until mid year when Bell ExpressVu launched their DTH service. To-day there are two DTH services operating in Canada and Star Choice Communications Inc. is committed to providing ultimate TV experience and confident that Star Choice valued customers will enjoy the benefits of digital television.





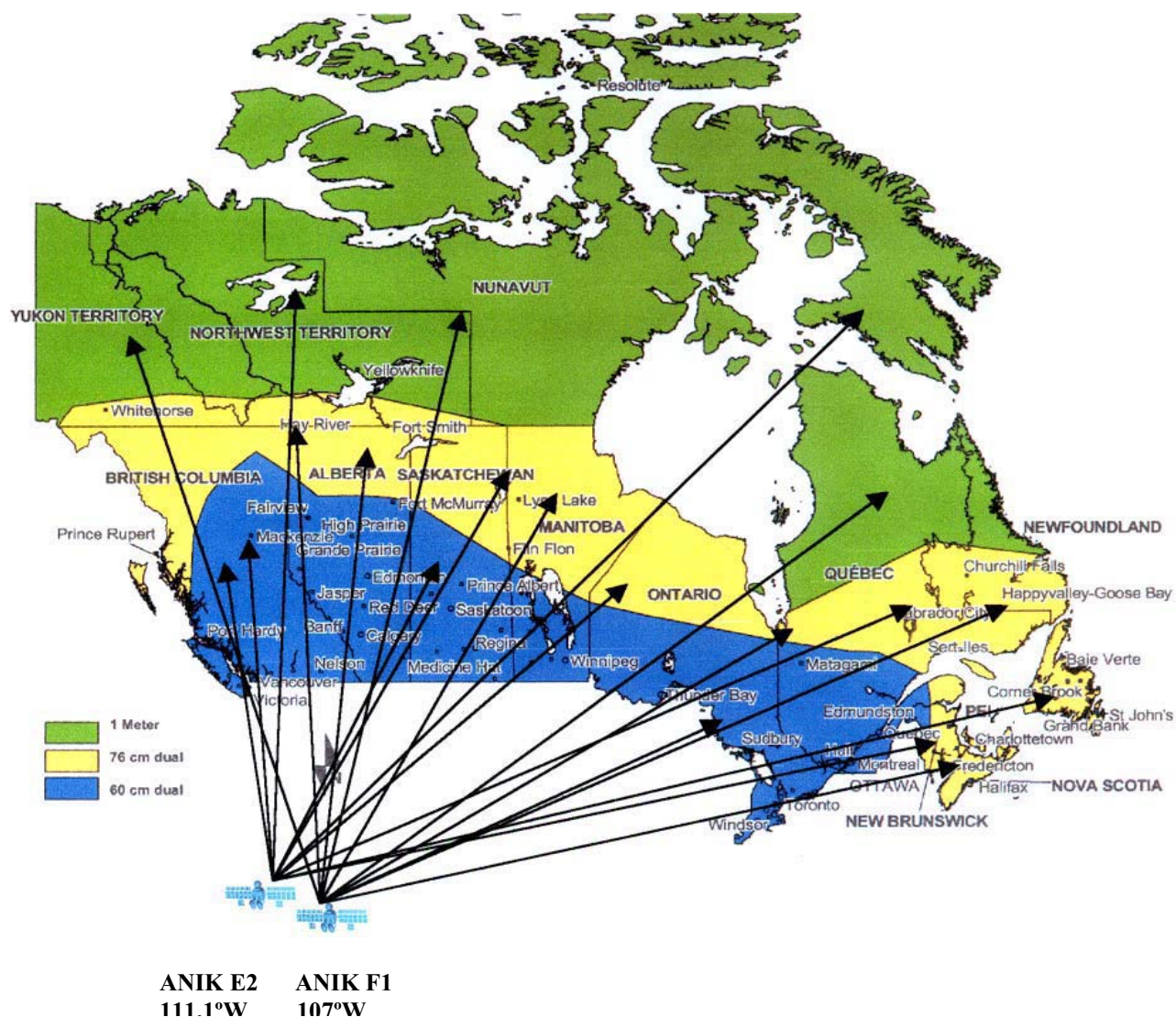
# Basic Satellite Fundamentals

Issued 5/12/02

## BACKGROUND INFORMATION ONLY

### 2.2 SATELLITE SIGNAL PATH

The Star Choice Earth Stations (up-link facilities) located across Canada and parts of the USA transmit signals up to the two Star Choice satellites (E2 and F1). Each satellite receives the up-link signals and converts them to lower frequencies and re-transmits them in a signal beam covering Canada for reception by Star Choice customers across Canada. The satellite transmitters commonly referred to as transponders, re-transmit the signals back to earth using up to 32 transponders per satellite. Note that the re-transmitted signal back to earth is in the 11.7 – 12.2 GHz frequency Band. (11,700 MHz – 12,200 MHz)



# Basic Satellite Fundamentals

Issued 5/12/02

## BACKGROUND INFORMATION ONLY

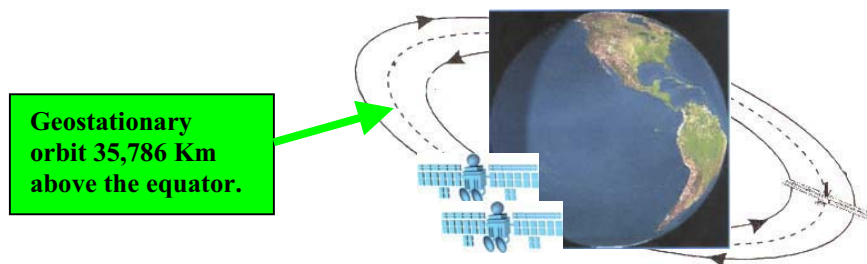
### 2.3 UP-LINK CENTER

The Star Choice multiple up-link facilities receive programming feeds from various sources via fiber optics, coaxial cable, over-the-air methods and satellite links from broadcast studios and other sources. The programming received from these various sources is combined in the up-link facilities complex equipment then re-transmitted 35,786 Km to the Star Choice satellites for re-broadcast to the Star Choice customers across Canada.

### 2.4 THE SATELLITES

Star Choice currently has two satellites called ANIK F1 and ANIK E2 that receive programming from the Star Choice's multiple up-link facilities. The two satellites receive the up-linked signals, lowers the frequencies and then re-broadcasts the signals via a microwave beam which is directed to cover all of Canada.

The satellites are in a geostationary orbit around earth, located approx. 35,786 Km above the equator in a zone known as the Clarke Belt. The satellites are in a geostationary orbit around earth that travels at the same speed that earth rotates; therefore **they remain in a fixed position with respect to the surface below**. This allows the receive dishes installed at Star Choice customer's homes to be installed in a fixed position.



**THE INFORMATION THUS FAR IS ONLY PROVIDED TO GIVE YOU A BASIC UNDERSTANDING HOW THE SATELLITE SIGNAL GETS TO THE STAR CHOICE DISH THAT YOU ARE INSTALLING AT THE CUSTOMERS HOME.**

**THE INFORMATION PROVIDED FROM HERE TO THE END OF THIS CHAPTER IS CRITICAL AND WILL ASSIST YOU TO UNDERSTAND THE FOLLOWING:**

- **VERTICAL AND HORIZONTAL POLARITY**
- **SKEW ADJUSTMENT THAT YOU MUST SET ON THE DISH**
- **HOW THE SIGNAL IS RECEIVED BY THE DISH/LNB**

# Basic Satellite Fundamentals

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## 2.5 POLARIZATION

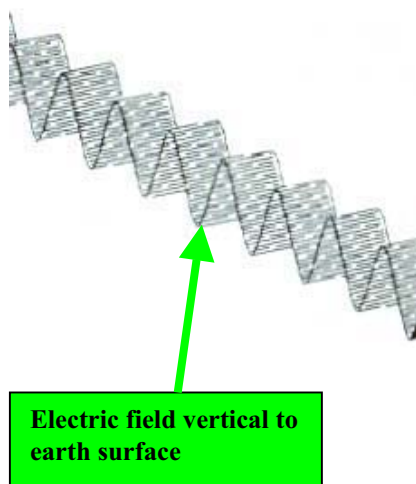
Microwave signals can be linearly or circularly polarized. Star Choice satellites transmit their signals using the linear polarization method while the Canadian competition and our neighbors to the south utilize the circular polarization method.

### 2.5.1 LINEAR POLARIZATION

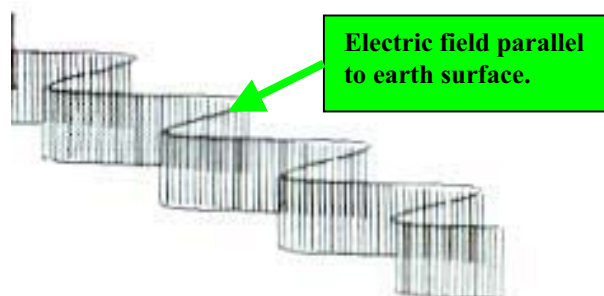
Linear polarization is the orientation of the electric field radiated from the transmitting antenna, which in this case, is the satellite transmit antenna. When the transmitted signal is oriented parallel to the ground, it is defined as horizontal polarization. When the direction of the radiated electric field is perpendicular to the ground it is defined as vertical polarization. (SEE POLARIZATION EXAMPLES BELOW)

The reason for using horizontal and vertical polarization on the same satellite is known as frequency re-use. A satellite will transmit 2 signals on the same frequency but one will be polarized vertical and the other horizontal, which prevents the two same frequencies from interfering with each other. This allows the twice the number of channels to be transmitted in a given bandwidth, one vertical and one horizontal. Star Choice satellites each transmit 16 vertical and 16 horizontal signals for a total of 32 signals from each satellite (combined total of 64 signals) towards earth.

#### VERTICAL POLARIZATION



#### HORIZONTAL POLARIZATION

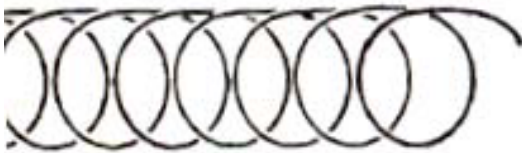
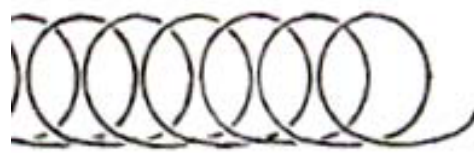


# Basic Satellite Fundamentals

Issued 5/12/02

## 2.5.2 CIRCULAR POLARIZATION

Circular polarization can also be used for satellite transmissions. Instead of positioning the microwave energy in either a vertical or horizontal plane, circularly polarized signals are transmitted in a spiral pattern like a spring coil. In circular polarized signals, the electric and magnetic fields rotate in a circular screw-like motion as they travel through space, a motion similar to a spiral. The direction of rotation determines the sense of circular polarization. A signal rotating in a right-hand direction as viewed from the satellite is right-hand circularly polarized (RHCP); a signal rotating in a left-hand direction is left-hand circularly polarized (LHCP). LHCP and RHCP in circular polarization provide the same capability as vertical and horizontal polarity with linear polarization. Satellites that use circular polarization are known as DBS satellites Vs FSS satellites that Star Choice utilizes. (See figures below)

**LEFT-HAND POLARITY****RIGHT-HAND POLARITY**

As previously mentioned Star Choice does NOT use this method of polarization. This information is ONLY provided to clear up some issues arising from questions asked by the customer, such as:

**Can I use my Grey Market dish when I switch to Star Choice to eliminate installing a new Star Choice dish?**

Obviously, the answer is NO, as Star Choice signals are linear polarized and are not compatible with the Grey Market or ExpressVu circular polarized systems.

**THE ABOVE INFORMATION ON CIRCULAR POLARIZATION IS ONLY PROVIDED TO GIVE YOU BASIC INFORMATION THAT WILL ALLOW YOU TO ANSWER A CUSTOMER'S QUESTIONS IN A KNOWLEDGEABLE AND PROFESSIONAL MANNER.**



# Basic Satellite Fundamentals

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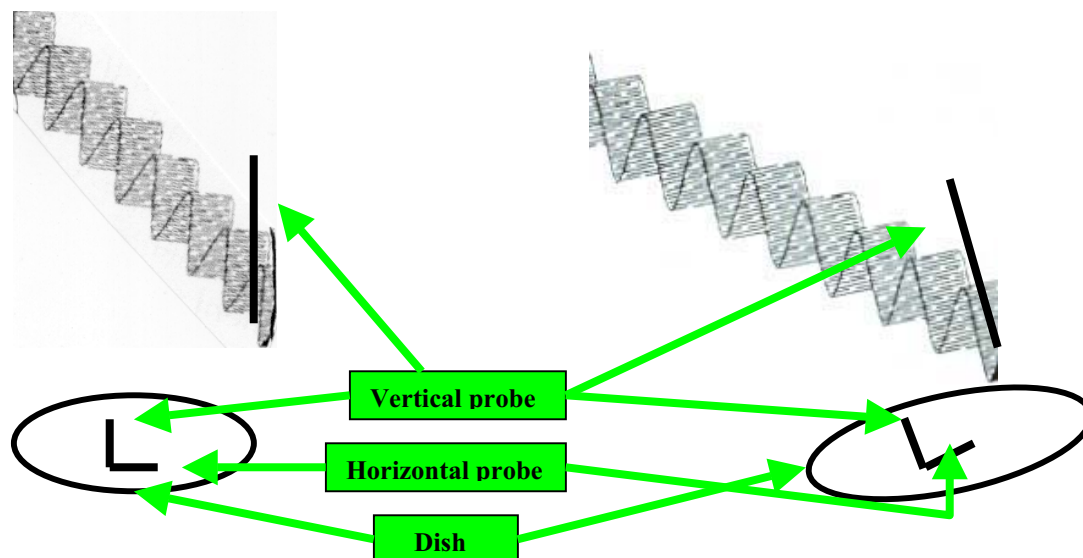
## 2.6 SKEW

Skew is the term used to describe how the LNB must be rotated so that antenna probe in the LNB matches the planes of polarity of the incoming satellite signal.

The figures below are simplified diagrams of the LNB antenna probe and the linear signal signals to assist you in understanding why you must skew the dish.

**VERTICAL POLARIZATION  
90° SKEW**

**VERTICAL POLARIZATION  
115° SKEW**



When the dish is skewed at 90°, the signal pick-up probe in the LNB is 90° with respect to earth where you are installing the dish. This will occur in Western Canada. As you move towards Eastern Canada the dish will need to be skewed to match the signal plane. This is due to the earth curvature changing the probe angle with respect to the fixed plane signal from the satellite. The example above shows that the right-hand dish had to be skewed in order that the probe would cross the signal at 90°. The skew adjustment (angle of the dish) will continuously increase as you move east.

Maximum signal is picked up when the orientation of the LNB probe is at the same plane as the microwave signal from the satellite.

# Basic Satellite Fundamentals

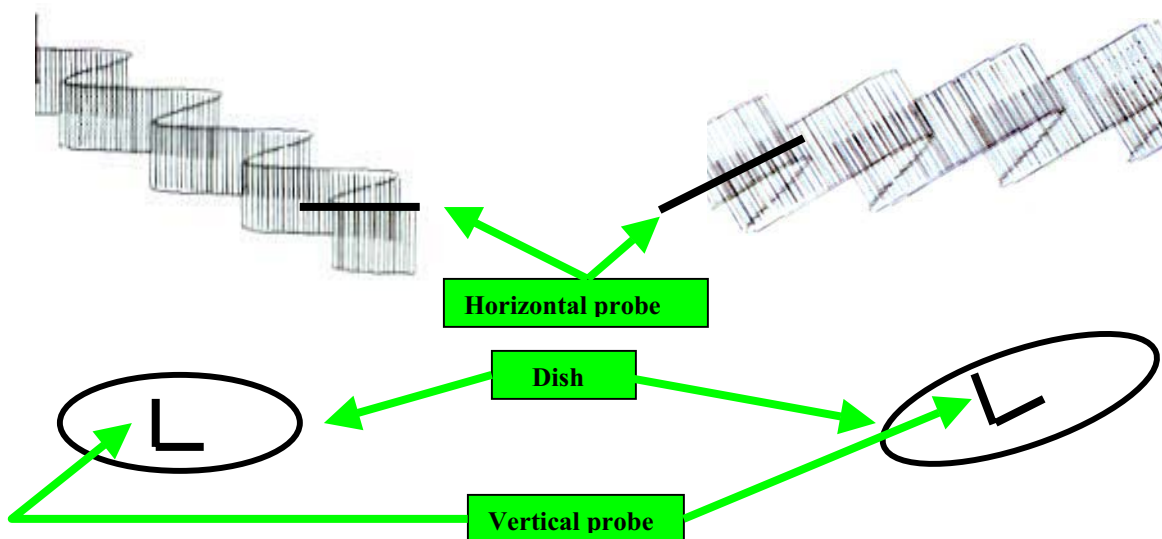
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## 2.6 SKEW cont'd

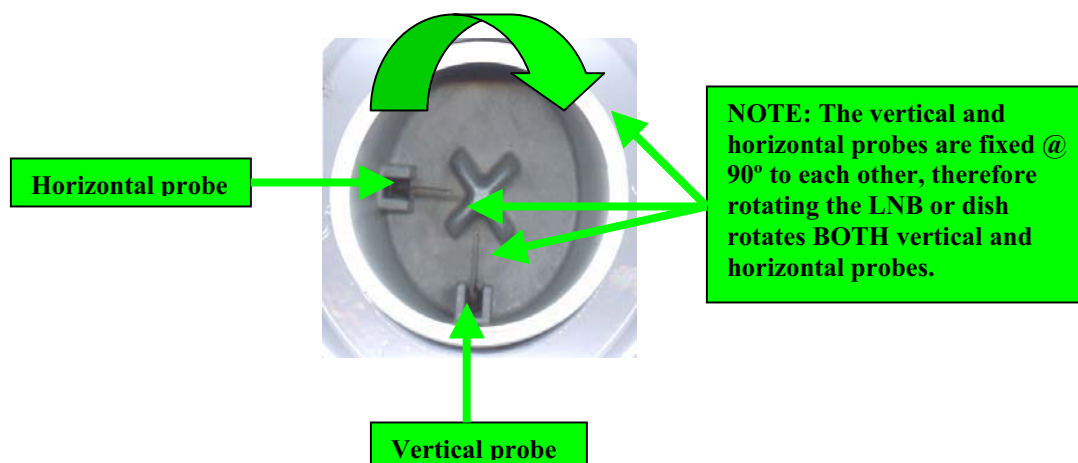
**HORIZONTAL POLARITY REACTS THE SAME AS VERTICAL POLARITY PREVIOUS DISCUSSED.**

**HORIZONTAL POLARIZATION  
90° SKEW**

**HORIZONTAL POLARIZATION  
115° SKEW**



**EXAMPLE OF AN ACTUAL LNB  
(INSIDE VIEW OF A LINEAR KU-BAND LNB)**

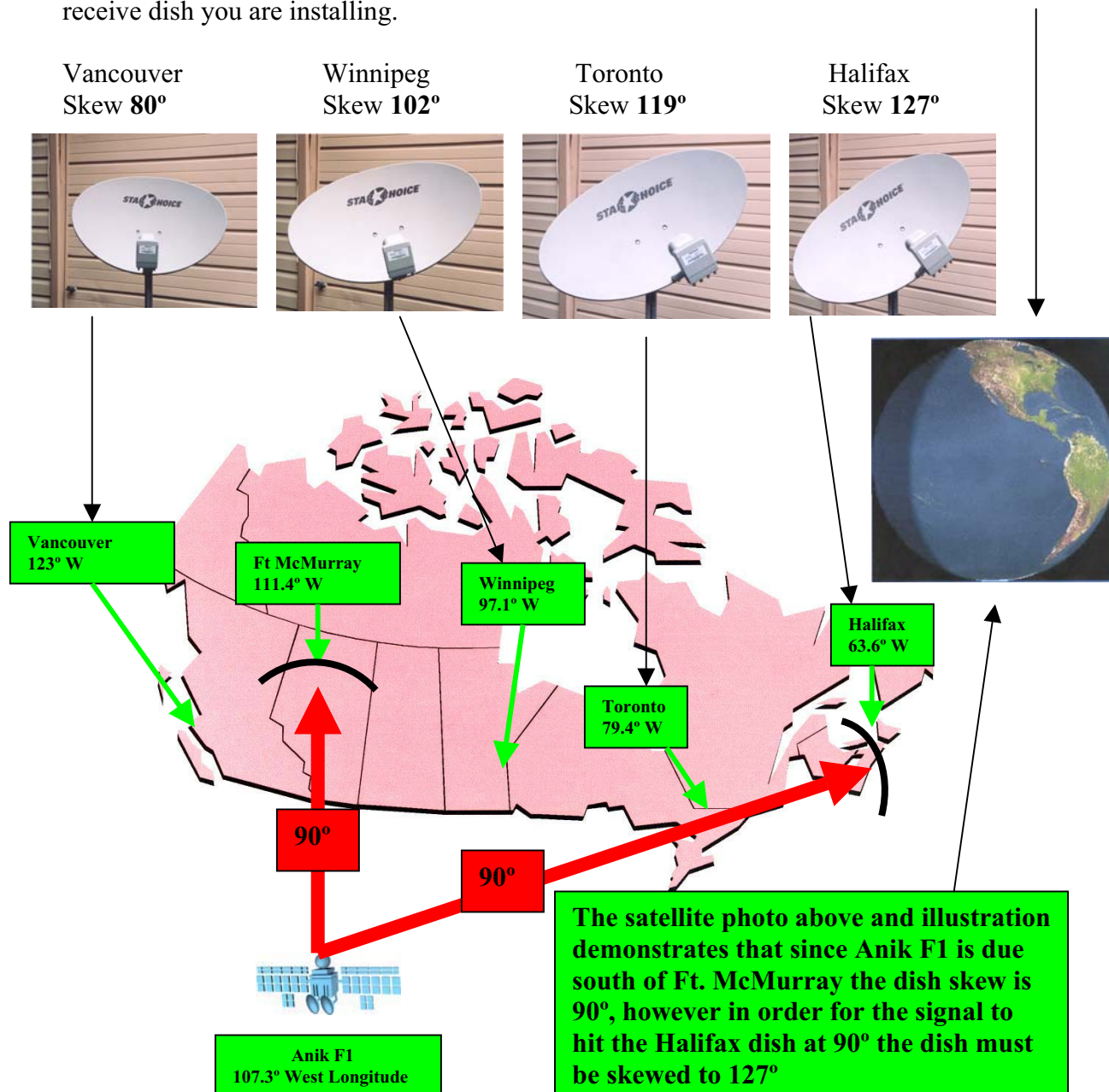


# Basic Satellite Fundamentals

Issued 5/12/02

## 2.6 SKEW cont'd

The skew examples below show the dish skew settings from Vancouver, British Columbia east to Halifax, Nova Scotia. The skew settings provided in the manual are based on the longitude location of the satellite (Anik F1 @ 107.3°) Vs location of the receive dish you are installing.



# Basic Satellite Fundamentals

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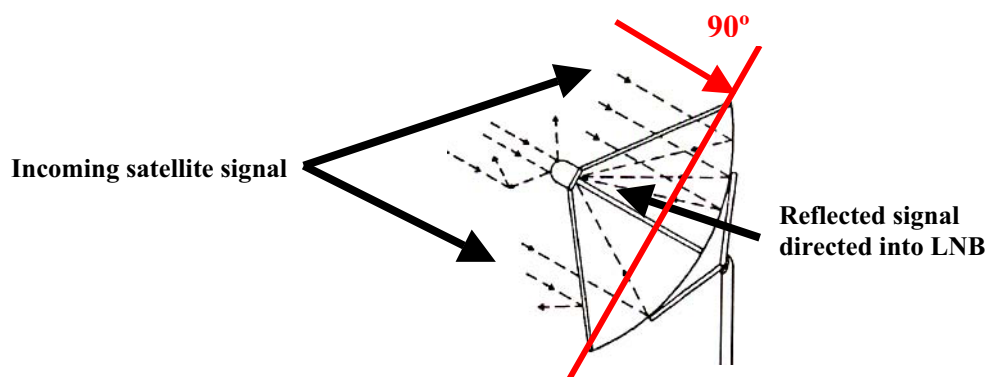
## 2.7 BASIC DISH DESIGN

The purpose of the satellite dish (reflector) is to collect and concentrate the signals coming from a targeted satellite while ignoring unwanted signals from other satellites.

There are several configurations of dishes used in the home satellite business such as prime focus, offset and multi-focus configurations. Star Choice utilizes two types of dishes; round offset dish designed to operate with one satellite and the elliptical multi-focus offset dish designed to receive signals from two satellites.

The diagram below shows how the prime focus parabolic dish receives and reflects the signal from a single satellite into the LNB.

### 2.7.1 PRIME FOCUS PARABOLIC DISH



The above dish is most commonly seen with the older “C” Band systems and note that the angle of the dish is 90° to the incoming signal (shown in red). In other words, **the angle of the dish directly faces the satellite.**

The above information is ONLY provided as a prelude to help you understand the information provided in the next few pages that leads into the design and operation of the two Star Choice dishes; the round single satellite dish and the elliptical multi-focus dual satellite dish.

**THIS INFORMATION IS CRITICAL IN UNDERSTANDING HOW AN OFFSET DISH RECEIVES THE SATELLITE SIGNAL AND WILL HAVE AN IMPORTANT IMPACT ON WHERE YOU CAN INSTALL YOUR DISH.**



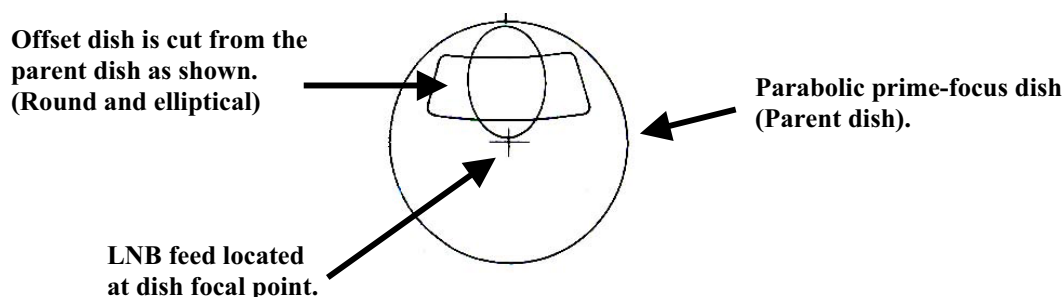
# Basic Satellite Fundamentals

Issued 5/12/02

## 2.7.2 OFFSET DISH

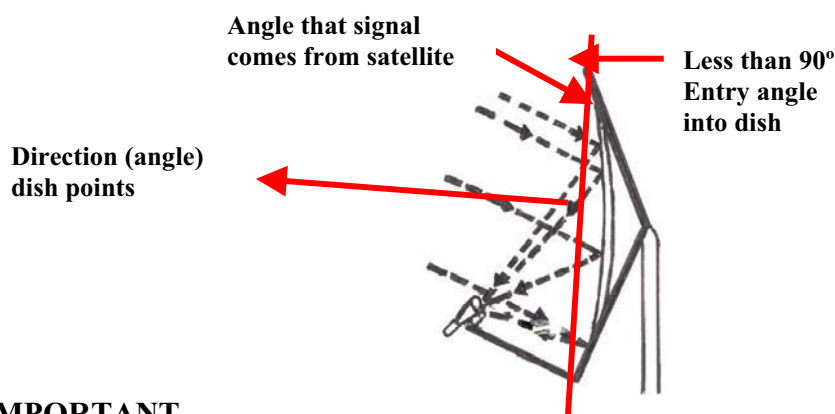
The surface of an offset dish (reflector) is essentially a section cut from the “parent” larger prime-focus parabolic dish. The LNB is still located at the same place in relation to the parent dish and all signals received are still reflected to the same focal point (LNB). See diagram below.

**Front View of Offset Dish**



Various shapes can be cut from the “parent” prime-focus dish so an offset dish can assume an elliptical, round, rectangular or any other shape. The original Star Choice dish was the round dish used to receive signals from the 1<sup>st</sup> satellite and moved to the elliptical design multi-focus dish for two satellite reception as shown above.

**Offset Dish**



### IMPORTANT

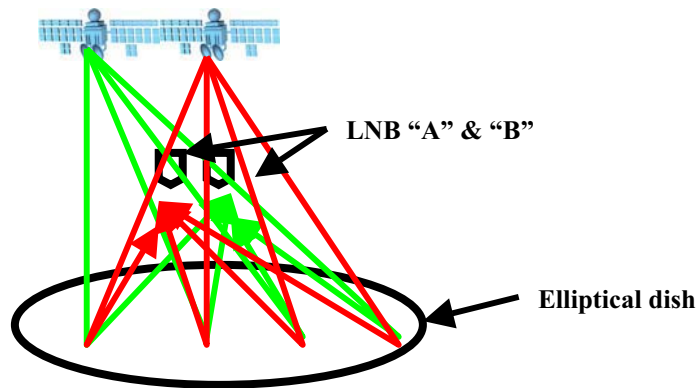
Note: Unlike the prime-focus dish shown earlier, the offset dish does **NOT** point at the angle the satellite is located. In other words, the signal enters the dish at an angle much higher than the angle the dish points.

**READ ON TO FIND OUT HOW THIS WILL ASSIST YOU IN DETERMINING YOUR DISH LOCATION**

# Basic Satellite Fundamentals

Issued 5/12/02

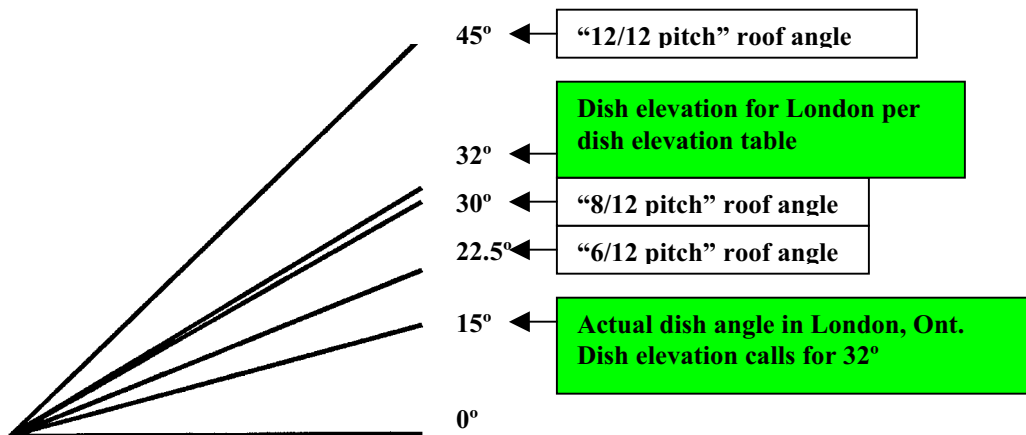
## 2.7.3 MULTI-FOCUS DISH



The design of the Star Choice elliptical dish (reflector) allows two satellite signals to be simultaneously reflected and detected by the LNBs, by focusing the incoming signals to two feeds located at different focal points.

It is clear to see, from the diagram above, that any azimuth or elevation adjustment on the dish will simultaneously affect both satellites.

## 2.8 SIGNAL ENTRY ANGLE Vs ROOF ANGLES



The above diagram shows the comparison between the **actual angle** of the dish in London, Ontario (15°) Vs the real signal dish elevation angle that the signal enters the dish. (32° per Satellite Locator Chart).

Roof angles are referred to as pitch. As an example, the "6/12 pitch" roof has an angle of 22.5° therefore putting a dish on the lowest point (overhang edge) will still allow the signal to enter the dish obstruction free when aiming over the roof.

# Basic Satellite Fundamentals

Issued 5/12/02

## 2.8 SIGNAL ENTRY ANGLE Vs ROOF ANGLES cont'd

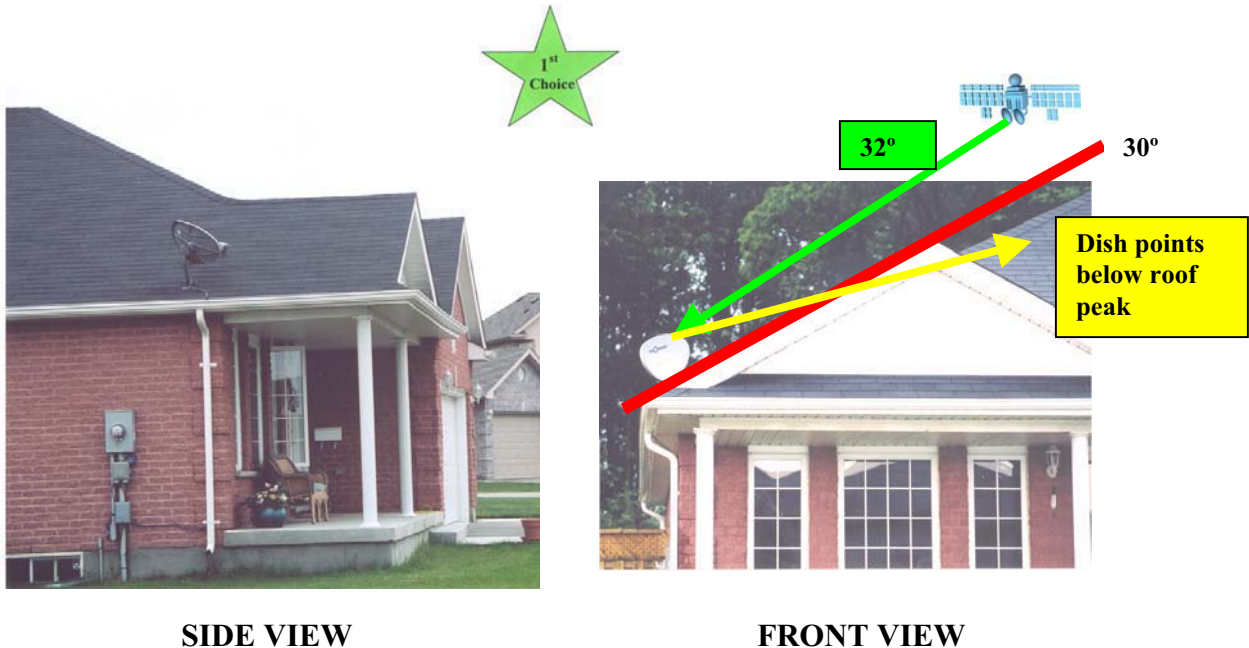
The majority of roofs built today, are either a 6/12 or 8/12 pitch therefore looking at the previous diagram it can be seen that when locating the dish on the lowest overhang point on the roof, the peak of the roof will NOT interfere with the signal.

### LET'S LOOK AT SOME REAL INSTALLATIONS

## 2.9 DISHES ON ROOFS

**\*\*NOTE\*\*** Mounting dishes on roofs should be your last choice due to the possibility of water leakage and subsequent damage. Whenever dishes are roof mounted ensure the guidelines in Section 5.0 are adhered to.

The installation below is installed correctly and is aesthetically pleasing. The home has an “8/12 pitch” roof that represents a 30° roof angle.



The above installation in London, Ontario was professionally installed and meets ALL Star Choice installations standards:

- ✓ As can be seen on right side photo the line-of-sight to the satellite signal is well above the roof peak. (30° - 8/12 pitch). The dish points below the roof peak giving the impression the signal would be blocked.
- ✓ Dish installed close to coaxial cable entry point into home.
- ✓ Dish installed as low as possible on roof. (Installer worked from ladder)
- ✓ Cable run kept as short as possible. (NO cables on roof).

# Basic Satellite Fundamentals

Issued 5/12/02

## 2.9 DISHES ON ROOFS cont'd



### UNACCEPTABLE INSTALLATION:

- ✓ Dish TOO high on roof.
- ✓ Cables unnecessarily placed on roof.
- ✓ NOT aesthetically pleasing.
- ✓ Installer worked on roof when NOT required. – Could have worked from ladder.
- ✓ Time lost from excessive time spent working from roof.

LOCATION WHERE DISH SHOULD HAVE BEEN INSTALLED.

## 2.10 DISHES ON POLES

Dish was installed on an extension pole as installer thought extra height was required to clear roof of adjacent Condo. (32° elevation height of satellite WELL above roof)



LOCATION WHERE DISH SHOULD HAVE BEEN INSTALLED



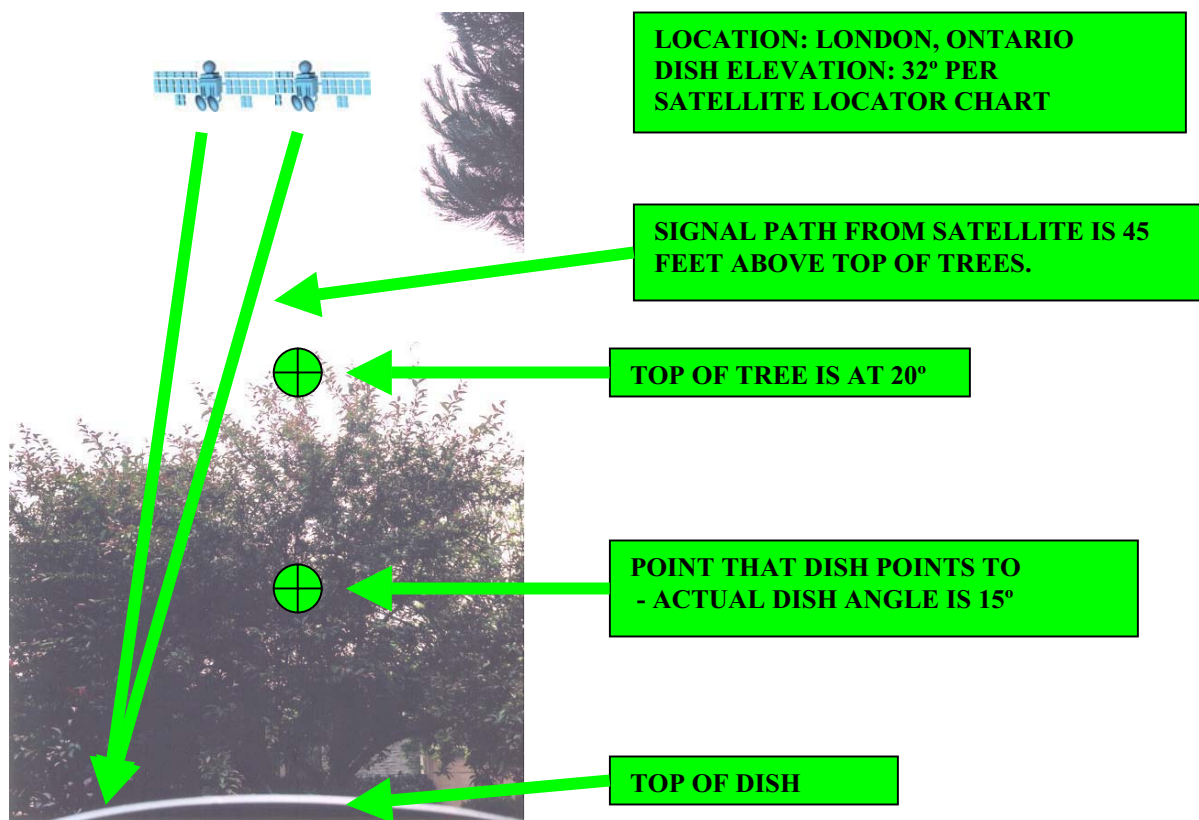
WHY INSTALL A DISH ON A POLE WHEN THE NEIGHBOURS DISH IS AT FENCE LEVEL?

# Basic Satellite Fundamentals

Issued 5/12/02

## 2.11 DISHES OVER TREES

Again, understanding the concepts discussed in previous sections will assist in locating the dish to an acceptable location. When determining line-of-sight over trees, keep in mind that trees grow in height at various rates, therefore ensure you have sufficient height above the trees to allow for growth.



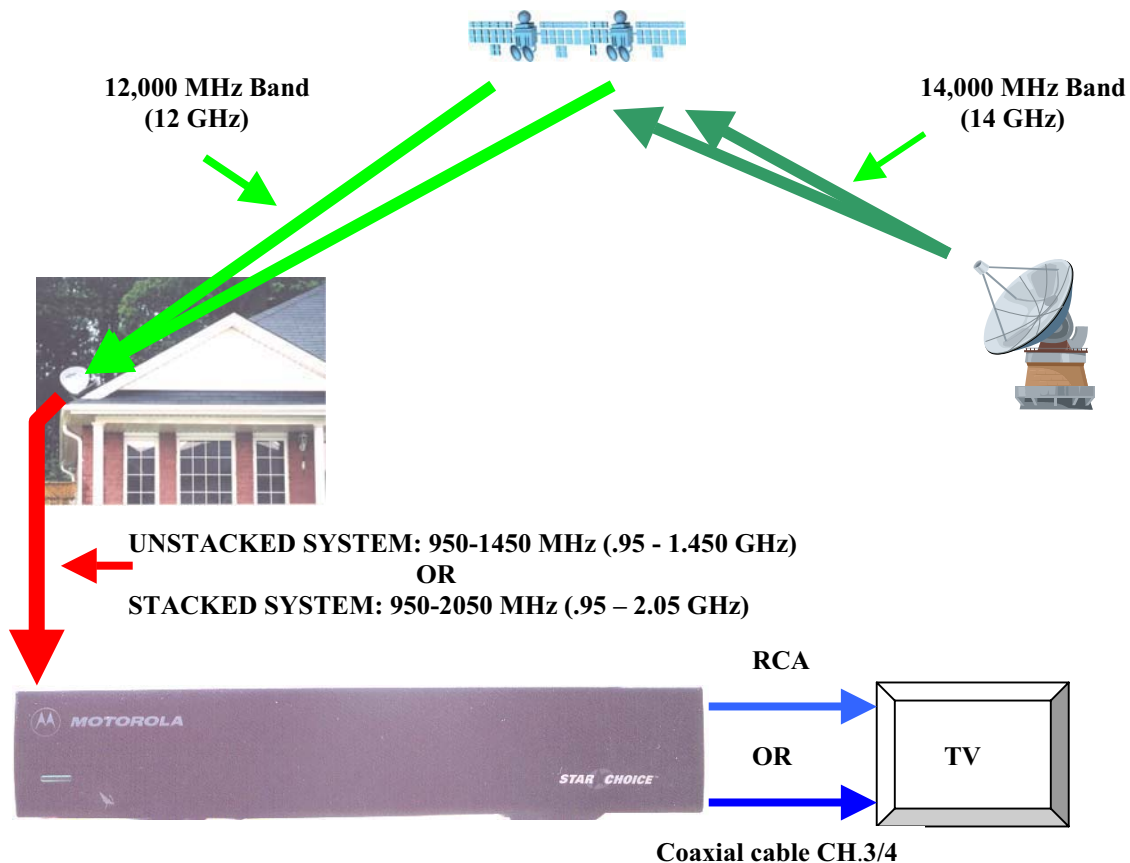
The above installation is acceptable as there is plenty of room above the trees (approx 45 feet) however, the appearance of the dish would make most believe that the trees would block the signal.

# Basic Satellite Fundamentals

Issued 5/12/02

## 2.12 SUMMARY

### ➤ FREQUENCY SUMMARY



### ➤ POLARIZATION

- Star Choice utilizes vertical (V) and horizontal (H) polarity in the up-link and down-link signals.

### ➤ SKEW

- Skew is the adjustment made to each DISH that must be rotated so the antenna probes in the LNB match the planes of vertical and horizontal polarity of the incoming satellite signals.

### ➤ SIGNAL ENTRY ANGLE INTO DISH

- REMEMBER... the angle the signal enters the dish is approx. 17° higher than the actual elevation angle that the dish points.





# Installer Conduct and Safety Overview

Issued 5/12/02

## 1.1 INSTALLER'S "CODE of CONDUCT"

Every Star Choice contractor, independent installer and/or employee is a direct representative of Star Choice Communications Inc. on every project and as such, his/her conduct has a direct reflection on Star Choice's image. All installers must conduct themselves with the utmost professionalism on any project site. The following are general guidelines for all personnel:

1. Employees, Independent Installers and Contractors representing Star Choice will be well groomed with clothing / uniforms that are neat and kept in good repair. Short pants are not recommended on any job site.
2. When driving the company vehicle, exercise **extra courtesy and consideration** for other drivers and pedestrians, as you are very visible to the public.
3. Customer relations **begin with a positive approach**. Being enthusiastic is the key to creating a professional image that the customer will remember and appreciate.
4. Customer **acceptance must be obtained from the owner(s)** and not their children, baby sitters, tenants, etc. If necessary, re-book the installation when the owners are present to obtain their approval.
5. Whomever lets you in the home, he or she must be asked to stay with you at all times to prevent you from being held personally liable for any valuables that turn up missing or damaged after you leave!
6. Activities prohibited;
  - Use of alcohol or drugs during the course of the workday.
  - Theft of, or willful damage to, any property.
  - Physical abuse of other employees or customers.
  - Harassment of and/or fraternizing with customers.
  - Use of profanity while representing Star Choice Communications Inc.
  - Promoting or selling anything other than Star Choice products during the course of the workday.
7. Do not use the customer's tools or equipment to perform your work.
8. Be extremely careful when on private property, care must be taken to prevent damage to the customer's building or property.
9. Do not use the customer's bathroom. Use public facilities.
10. Clean up all debris you create, inside and outside the home.
11. Do not sit or put tools on the customer's furniture or equipment.
12. For all weather conditions, footwear should be covered with overshoes that can be removed when entering the customer's home.

### **PUT YOURSELF IN THE POSITION OF THE CUSTOMER**

YOU ARE A COMPLETE STRANGER – WOULD YOU FEEL CONFIDENT AND SAFE BY THE IMAGE YOU ARE PRESENTING TO STAR CHOICE'S VALUABLE CUSTOMER

**YOUR CONTRIBUTION WILL ASSIST STAR CHOICE IN BECOMING AND REMAINING CANADA'S 1<sup>ST</sup> CHOICE FOR SATELLITE TV**

# Installer Conduct and Safety Overview

Issued 5/12/02

## 1.2 SAFETY OVERVIEW

### 1.2.1 GENERAL

This Installation Handbook is not a comprehensive Safety Manual however this manual will briefly highlight safety issues as applicable to the satellite installer. Safety training is described and covered in other handbooks governed by the Star Choice Health and Safety Committee.

The next few sub-sections will briefly discuss safety topics pertaining directly to the satellite installation. To assist in highlighting the various safety issues throughout this handbook, the following icons will periodically appear to stress a safety issue related to a particular work operation:

1. Meet **Mr. Simple Safety** - he will draw attention to various work operations throughout the Installation Handbook and will have a few comments with each.



2. **Eye protection reminder**



3. **Head protection reminder**



4. **Safety footwear reminder**



5. **Ladder safety reminder**



6. **Fall protection reminder**



7. **Hand tools safety reminder**



8. **Vehicle safety reminder**



# ***Installer Conduct and Safety Overview***

Issued 5/12/02

## **1.2.1 GENERAL cont'd**

**STAR CHOICE COMMUNICATIONS INC. IS COMMITTED TO PROVIDING THE SAFETY TRAINING TO ENSURE THEIR WORKERS' SAFETY EVERY DAY, BUT TRAGICALLY, SOME WORKERS DO NOT GO UNINJURED.**

**FROM 1994 TO 1998 22% OF LOST TIME CONSTRUCTION ACCIDENTS IN ONTARIO WAS ATTRIBUTED TO FALLS AND 37% OF ALL CONSTRUCTION FATALITIES IN ONTARIO WERE ATTRIBUTED TO FALLS.**

**DO NOT BECOME ANOTHER STATISTIC, IMPLEMENT AND ADHERE TO THE SAFETY TRAINING RECEIVED...THE FINAL DECISION IS YOURS.**

## **1.2.2 EYE PROTECTION**



**YOU HAVE ONLY ONE PAIR OF EYES – MAKE THEM LAST A LIFETIME**

### **Eye Hazards:**

- Flying dust and particles from drilling.
- Ultraviolet radiation from the sun.
- Ties and wires hanging down from ceilings.
- Flying wire clips or other material from snipping off cables or tie wraps.
- Sharp branches when working around CSE boxes or running exterior cable.

### **Eye protection is the answer:**

- Do not continue to work if your safety eyewear becomes fogged; stop work and clean your glasses.
- Must be properly selected and fitted.
- Keep with you at all times.
- Clean often with water or solution, as wiping dry will scratch the lens.
- Replace pitted or scratched lenses when required as this will impair vision and reduce impact resistance.
- Get your eyes checked every couple of years.

**PROTECTING YOUR EYES FROM INJURY ON THE JOB IS ONE OF THE EASIEST  
THINGS YOU CAN DO**



# ***Installer Conduct and Safety Overview***

Issued 5/12/02

## **1.2.3 HEAD PROTECTION**



**YOUR HEAD IS THE MOST IMPORTANT PART OF YOUR BODY. THINKING, FEELING, TALKING, SMELLING, AND HEARING ALL START IN YOUR HEAD. THEREFORE, IT MAKES SENSE THAT YOU SHOULD PROTECT YOUR HEAD FROM INJURY.**

### **Hard Hat DO's:**

- Wear your hard hat on ALL construction sites.
- Wear your hard hat whenever someone is working overhead.
- Wear your hard hat when working with tools overhead.
- Wear your hard hat in confined work areas.
- Ensure your hard hat fits properly – provides most comfort and maximum protection.
- Inspect your hard hat every day for cracks, gouges, and frays or breaks in the straps.

### **Hard Hat DO NOT's**

- Do not drill holes in your hard hat.
- Do not drop or throw your hard hat.
- Do not leave your hard hat in sunlight for extended periods such as on the dash of your vehicle.
- Do not attach foreign material such as stickers/nametags to your hard hat.

**WEARING YOUR HARD HAT IS THE FIRST LINE OF DEFENSE AGAINST  
HEAD INJURIES ON THE JOB  
USE YOUR HEAD – WEAR YOUR HARD HAT**

## **1.2.4 FOOT PROTECTION**



**BROKEN TOES AND PUNCTURED SOLES WILL KEEP YOU OFF YOUR FEET.**

### **Safety Footwear DO's:**

- Wear safety shoes or safety boots at all times.
- Ensure safety footwear sole is adequate to protect against injury to puncture.
- Ensure safety toe is adequate to protect against injury due to impact.
- Ensure that safety footwear is securely laced.

**MAINTAIN YOUR MOBILITY – WEAR PROTECTIVE FOOTWEAR**

# Installer Conduct and Safety Overview

Issued 5/12/02

## **1.2.5 LADDER SAFETY**



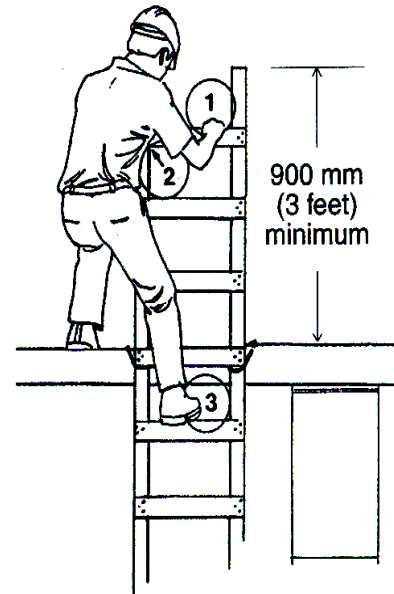
**DON'T FALL FOR IT – CHECK YOUR ATTITUDE AND YOUR SAFETY PROCEDURES.**

**A FALL FROM ANY HEIGHT IS DANGEROUS**

### **1.2.5.1 CLIMBING UP AND DOWN LADDERS**

#### **Ladder Safety DO's:**

- Always maintain three points of contact – this means two hands and one foot OR two feet and one hand on the ladder at all times. Three-point contact prevents injuries from slips and falls.
- Put both hands on rungs before stepping onto a ladder.
- Use three-point contact when climbing up and down a ladder.
- Break three-point contact when you reach ground or a stable platform (roof).
- Always climb up and down **FACING** the ladder.
- Keep your body between the side rails. **DO NOT** lean out on either side.
- Ensure ladder extends at least three feet above the top bearing point.
- Clean mud, snow and other slippery substances off your safety footwear before climbing.
- Move the ladder to avoid overstretching, and re-secure it whenever necessary, however frustrating it might be!



#### **Ladder Safety DO NOT's:**

- Do not carry tools, equipment, or material in your hands while climbing – use a shoulder tool bag, belt holster, belt hooks or hoist line for lifting and lowering tools and/or satellite hardware.
- Do not carry heavy items or long lengths of material up a ladder.
- Do not reach too far forwards or sideways, or stand with one foot on the ladder and the other on something else.

**CLIMBING UP AND DOWN LADDERS IS NOT AS EASY AS IT SOUNDS.  
MANY ACCIDENTS OCCUR WHEN WORKERS ARE GETTING ON AND OFF  
THE LADDER**

# Installer Conduct and Safety Overview

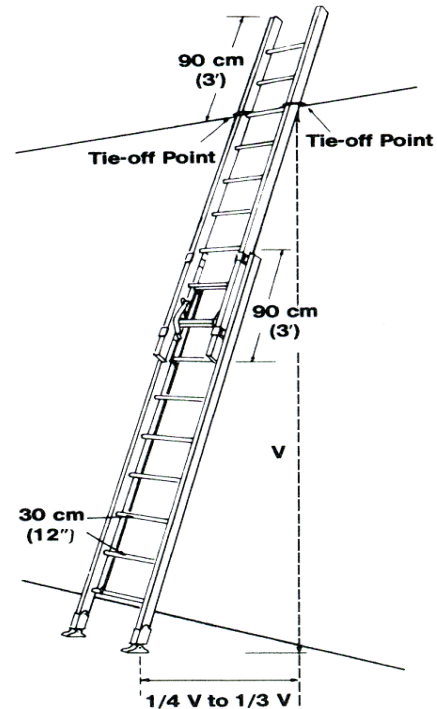
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## 1.2.5.2 EXTENSION LADDERS

Majority of installations would be impossible without ladders. The most common ladder used is the extension ladder.

### Extension Ladder DOs:

- Ensure your ladder is long enough to be set up at a safe angle and extends 90 cm (3 ft.) above the top bearing point.
- Inspect your ladder for damage and defects
  - ✓ Before you set it up.
  - ✓ After it has been used somewhere else by other workers.
  - ✓ After it has been in one place for extended periods.
- Set the ladder on a firm level base.
- Set up ladder at proper angle – one foot out for every three or four feet up.
- Ensure there is at least 15 cm (6 in.) of clear space behind each ladder rung. (Except tie-off point)
- When the ladder is fully extended, ensure ladder sections overlap at least 90 cm (3 ft.).
- Keep areas at top and bottom clear of debris, scrap, material and other obstructions.
- Always face the ladder when climbing up or down and maintain three-point contact.
- Ensure ladder hoist rope is clear of footpath. Recommend tying bottom fly rung to adjacent base rung.
- Clean mud, snow and other slippery substances off your safety footwear before climbing.
- When working at a height of more than 3 m (10 ft.) wear a safety harness and tie off to a well-anchored lifeline or other support – NOT the ladder. Refer to 1.2.6 Fall Protection.



### Extension Ladder DO NOT's:

- Never erect extension ladders on boxes, carts, tables or other unstable objects.
- Never set extension ladders against flexible or movable surfaces.
- Do not carry tools, equipment or material in your hands while climbing – use an over the shoulder tool bag or hoist line for lifting or lowering.
- Metal or metal-reinforced ladders are not permitted due to the danger of electrical shock from electrical wires or equipment.
- Never stand higher than the fourth rung from the top.

# Installer Conduct and Safety Overview

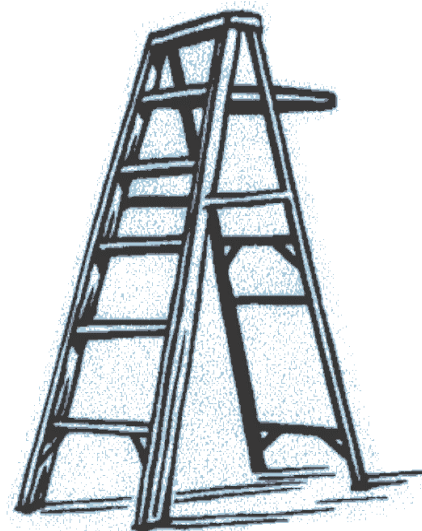
Issued 5/12/02

## 1.2.5.3 STEP LADDERS

There is no such thing as a good fall. Even a fall from a low height, such as a 90 cm (3 ft.) step ladder, can result in serious head injury or broken bones.

### Step Ladder DO's:

- Open the ladder as far as it goes.
- Lock the spreader arms in place.
- Push the bracket shelf down into place.
- Ensure the ladder is placed on an even space and within easy reach of your work.
- If setting your ladder up in front of a closed door, open the door or lock it.
- Always inspect the ladder before using it for:
  - ✓ Cracks
  - ✓ Splits
  - ✓ Twisted or jammed parts
  - ✓ Loose screws, rivets or rungs.
- Always climb and descend facing the ladder.
- Climb the ladder one rung at a time.
- Set your tools on the bracket shelf of the ladder – do not climb with them in your hands.



### Step Ladder DO NOT's:

- Do not stand on the top two rungs of any step ladder.
- Do not stand on the bracket shelf.
- Do not stand a ladder on ice or snow.
- Do not use an unstable object – like a rock or a brick – to level the ladder's feet.
- Do not overextend or stretch yourself to reach the work – move your ladder.

**TAKING UNNECESSARY RISKS ON STEP LADDERS MAY RESULT IN  
UNWANTED TIME OFF – IN THE HOSPITAL**



**FOLLOW THE INSPECTION PROCEDURES IN  
ATTACHMENT #1-1 PRIOR TO USING ANY PORTABLE  
LADDER!**



# Installer Conduct and Safety Overview

Issued 5/12/02

## 1.2.6 FALL PROTECTION

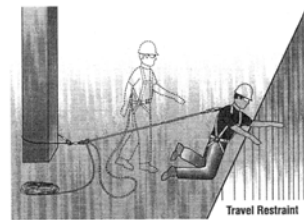


**FALL PROTECTION MUST BE WORN WHERE YOU COULD FALL AT LEAST 3M (10 ft.) OR WHERE A FALL FROM A LESSER HEIGHT MAY RESULT IN SERIOUS INJURY**

The two basic types of fall protection are travel restraint and fall arrest. Both involve a full body harness.

### Travel Restraint System

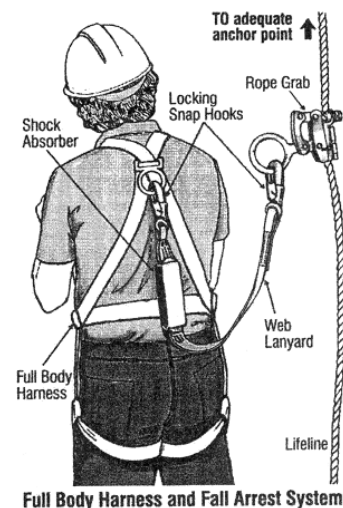
A travel restraint system keeps you from getting too close to an unprotected edge. It consists of a full body harness, lifeline and lanyard that will *restrain your travel*.



### Fall Arrest System

A fall arrest system consists of a full body harness, a lanyard and a shock absorber that must be used if you are in danger of falling:

- More than 3m (10 ft.)
- Into operating machinery
- Into water or other liquid
- Into or onto a hazardous substance or object.



**FALLS ARE THE HIGHEST CONTRIBUTOR TO INJURY AND FATALITIES  
IN THE CONSTRUCTION INDUSTRY**



# Installer Conduct and Safety Overview

Issued 5/12/02

## 1.2.6 FALL PROTECTION cont'd

Fall protection is a complex safety issue involving several types of fall protection devices and anchor methods. Refer to your fall protection training and documented guidelines provided by the Health and Safety Committee or other training resources.

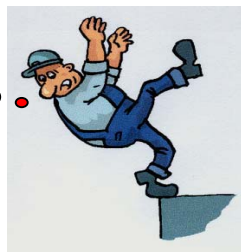
The following information is a quick reference on the DO's and DO NOT'S of fall protection.

### Fall Protection DO's

- Before using fall arrest equipment, inspect all components carefully. Make sure that:
  - ❑ **Harness**
    - ✓ Hardware and straps are intact and undamaged.
    - ✓ Moving parts move freely through their full range of motion.
    - ✓ Webbing is free from burns, cuts, loose or broken stitching, frayed material and signs of heat or chemical damage.
  - ❑ **Lanyard**
    - ✓ Lanyard is fastened securely to the D-ring on the harness.
    - ✓ Inspect for fraying, kinking and loose or broken stitching.
    - ✓ Check for rust, cracks and damage.
    - ✓ Check shock-absorbing lanyards regularly.
  - ❑ **Lifeline**
    - ✓ Inspect fibre rope lifelines for fraying, burns, kinking, cuts and signs of wear and tear.
    - ✓ Check retractable block lifelines for smooth operation. Pull out line and jerk it suddenly. Braking action should be immediate and tight.

### Fall Protection DO NOT's

- Do not reuse any equipment that has been involved in a fall arrest until the manufacturer certifies that all components are safe for reuse.
- Do not attach more than one worker to a lifeline.
- Do not leave your protection unattended or thrown into the back of your vehicle – store it in the carrying bag provided that is usually provided by the Manufacturer.



# Installer Conduct and Safety Overview

Issued 5/12/02

## 1.2.7 HAND TOOL SAFETY

### 1.2.7.1 GENERAL



Hand tools are the tools of your trade and will function properly if they are maintained and kept in good working condition. Tools used improperly will result in damage, making them dangerous to use or unable to perform the work operation they were designed for. Good quality tools are expensive to replace and will last a long time if looked after properly.

#### Hand Tool DO's:

- Carry all sharp tools in a sheath or holster.
- When handing sharp tools to another person keep sharp points and cutting edges away from yourself and the other person.
- When using knives, shears or cutting tools, cut in a direction away from your body.
- Transport hand tools only in tool boxes or tool belts; do not carry tools in your clothing.
- Tag worn, damaged or defective tools "Out of Service" and do not use them.

#### Hand Tool DO NOT's

- Do not lay tools on roofs, ladder steps or elevated locations.
- Do not throw tools from one location to another or from one worker to another.
- Do not carry tools in your hand while climbing.
- Do not carry tools in your clothing.
- Do not perform "make-shift" repairs to tools.
- Do not use a tool if it has splinters, burrs, cracks or head of tool is loose.





# Installer Conduct and Safety Overview

Issued 5/12/02

## 1.2.7 HAND TOOL SAFETY cont'd

### 1.2.7.2 HAMMERS



- Use only a claw hammer for pulling nails.
- Do not strike nails or other objects with the cheek of the hammer.
- Do not strike a hardened steel surface, such as a cold chisel, with a claw hammer.
- Do not strike one hammer against another hammer.
- Do not use a hammer if your hands are oily, greasy or wet.
- Do not use a hammer as a pry bar or a wedge or for pulling large spikes.
- Use only a sledge type hammer for inserting rods or masts into the ground.

### 1.2.7.3 PLIERS



- Do not use pliers as a hammer or a wrench.
- Do not attempt to force pliers by using a hammer on them.
- Do not slip a pipe over the handles of pliers to increase leverage.
- Do not use pliers that are cracked, broken or sprung.
- When using diagonal cutting pliers, shield the loose pieces of cut material from flying into the air by using a cloth or your gloved hand.

### 1.2.7.4 SCREWDRIVERS



- Always match the size and type of screwdriver blade to fit the head of the screw.
- Use a drill, nail or punch to make a starting hole for the screw.
- Do not hold the work piece against your body while using a screwdriver.
- Do not put your fingers near the head of the screw when tightening a screw.
- Do not force a screwdriver by using a hammer or pliers on it.
- Do not use a screwdriver as a punch, chisel, pry bar or nail puller.
- Do not carry a screwdriver in your pocket.
- Do not use a screwdriver if your hands are wet, oily or greasy.

# Installer Conduct and Safety Overview

Issued 5/12/02

## 1.2.7 HAND TOOL SAFETY cont'd

### 1.2.7.5 DRILLS



- Do not use dull, bent or cracked drill bits.
- Do not use electric drills if your hands are wet.
- Do not stand in water or on wet surfaces when using electrical tools.
- Do not leave drill bits or other adapters in drills when not in use.
- Do not carry electric drills by the electrical cord.
- Do not use electric drills with the “U” ground on the plug removed.
- Do not use electric extension cords to plug a drill in with the “U” ground missing.
- Do not unplug electric tools by pulling on the cord – pull on plug.
- Do not change drill bits while the drill is connected to the electrical outlet.

### 1.2.7.6 WRENCHES



- Do not use wrenches that are bent, cracked or badly chipped or that have loose or broken handle.
- Do not slip a pipe over a single head wrench handle for increased leverage.
- Discard a wrench that has spread, nicked or battered jaws or if the handle is bent.
- Do not use a wrench as a hammer.
- Use a box or socket wrenches on hexagon nuts and bolts as a first choice, and open-end wrenches as a second choice.

## 1.2.8 VEHICLE SAFETY



**EXERCISE EXTRA COURTESY AND CONSIDERATION FOR OTHER DRIVERS AND PEDESTRIANS, AS YOU ARE VERY VISIBLE TO THE PUBLIC.**

- Turn off the vehicle and do not smoke when refueling.
- Wash your hands with soap and water if you spill gasoline on your hands.
- Shut your door and fasten seat belt before moving your vehicle.
- Obey all traffic signs and laws at all times.
- Maintain a three-point contact using both hands and one foot or both feet and one hand when climbing into or out of vehicles.
- Back your vehicle into driveways whenever possible.
- Always lock your vehicle when unattended.
- Use safety cones at the rear and front of your vehicle when parked on streets.

**SAFE AND HAPPY DRIVING**



# *Installer Conduct and Safety Overview*

Issued 5/12/02

## ATTACHMENT #1-1 Page 1 of 2

### PORTABLE LADDER INSPECTION

#### LADDER HAZARDS

Ladder accidents usually are caused by improper selection, care or use, not by manufacturing defects. Some of the more common hazards involving portable ladders, such as instability, electrical shock, and falls, can be predicted and prevented. Prevention requires proper planning, correct ladder selection, good work procedures and **adequate ladder maintenance**.

#### LADDER INSPECTION

It is important that individuals using portable ladders be familiar with and is responsible for, conducting ladder inspections on a regular basis.

- Inspect your ladder for damage and defects
  - ✓ Before you set it up.
  - ✓ After it has been used somewhere else by other workers.
  - ✓ After it has been in one place for extended periods.

#### LADDER TIPS

It is important that individuals responsible for conducting ladder inspections identify not only the obvious. The inspection procedures will assist in what to look for. In addition to these procedures it must be noted that:

- Side rails that have been damaged or bent should not be straightened. Once the side rail material has been bent the strength characteristics of the profile have been compromised.
- Loose rungs are normally caused from the severe over-stressing of the ladder. Simply tightening the rungs will not make the ladder structurally sound.
- Under no circumstances should loose rungs be welded, unless the ladders are designed with welded rungs. Welding the rungs will soften the material, reducing the tensile strength of the material.

# Installer Conduct and Safety Overview

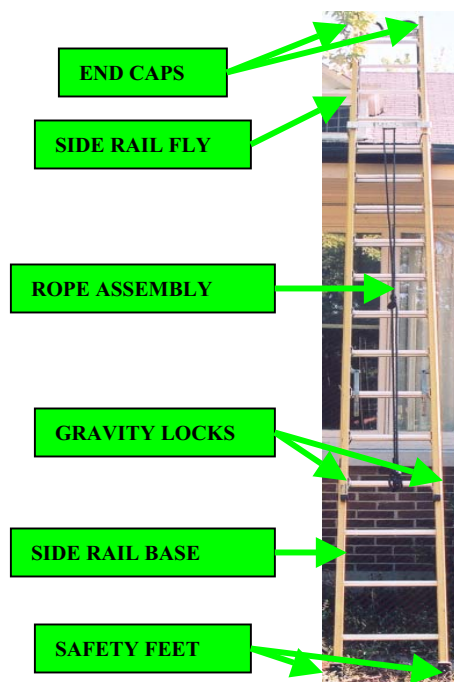
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## ATTACHMENT #1-1 Page 2 of 2

### PORTABLE LADDER INSPECTION

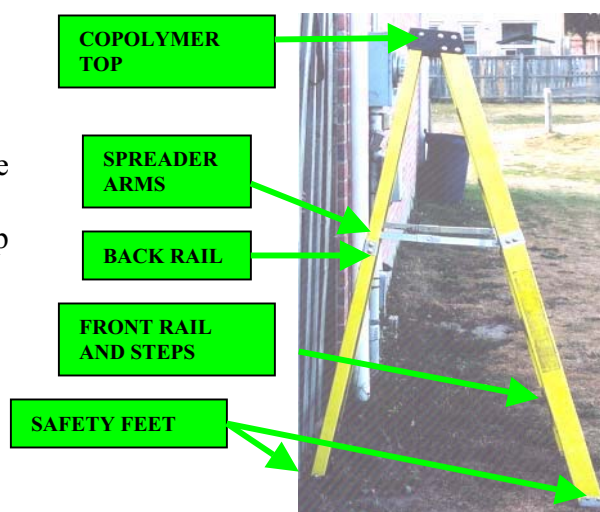
#### Extension Ladder Inspection Procedure:

- ✓ Inspect slide guides for cracks, chips or worn areas.
- ✓ Inspect rope to ensure it is tight and not frayed or knotted.
- ✓ Ensure that the base and fly sections are straight and free from warp.
- ✓ Inspect all rungs for dents and cracks and make sure they do not rotate.
- ✓ Inspect the safety feet for worn rubber pads and loose rivets, nuts and bolts.
- ✓ Inspect all end caps; they should be tight and free from cracks, chips and wear.
- ✓ Inspect the side rails of the base and fly making sure there are no dents or cracks.
- ✓ Inspect the gravity locks; they should pivot freely and the fingers should be in good working order.



#### Step Ladder Inspection Procedure:

- ✓ Inspect copolymer top for cracks or dents; make sure rivets, nuts and bolts are tight.
- ✓ Inspect spreader arms making sure they are tight and move freely.
- ✓ Inspect all steps, horizontal braces and step braces, making sure they are tight.
- ✓ Inspect the front and back, side rails for cracks, dents, bends or any other blemishes.



#### MOST LADDER ACCIDENTS ARE CAUSED BY TWO FACTORS:

1. THE USE OF UNSAFE LADDERS
2. THE UNSAFE USE OF LADDERS





# ***Cable / Connector Standards***

Issued 5/12/02



## **INSTALLATION HANDBOOK**

### **3.0**

#### **CABLE /CONNECTORS**

**and**

#### **CONNECTORIZATION STANDARDS**

# Cable / Connector Standards

Issued 5/12/02

## 3.1 GENERAL

The following sections set the minimum standards to be followed when installing Star Choice systems and all installers must adhere to the recommended standards and policies provided below:

## 3.2 COAXIAL CABLE REQUIREMENTS



To avoid unnecessary future service calls due to deteriorating cable, Star Choice Communications **DOES NOT** recommend the use of RG59 cable between the dish and the digital satellite receiver.

### RG59 Vs. RG6

- RG59 verified performance limited to 1,000 MHz.
- RG59 has considerable signal attenuation and roll-off at the higher L-Band frequencies (1450 MHz for unstacked and 2050 MHz for stacked).
- Higher frequencies are LESS forgiving to poor or careless installation practices and are greatly affected by bad connectors, humidity and cable bends/pinches.
- Existing RG59 hidden in walls or ceilings cannot be inspected to verify its condition.
- Existing RG59 cable may not initially show any noticeable signal degradation but, over a period of time, the introduction of the 13 and/or 18 volts on the RG59 may lead to deterioration of the cable and increase its resistive performance causing greater signal attenuation and higher frequency roll-off.
- Due to the above conditions RG59 cable is NOT suitable for the distribution of the L-Band frequency between the LNB and the digital satellite receiver.

### EXAMPLES OF COAXIAL CABLES LEFT IN-SERVICE CAUSING SERVICE OUTAGES



**INSPECT ALL EXISTING COAXIAL CABLES FOR DAMAGE**



# Cable / Connector Standards

Issued 5/12/02

## 3.2 CABLE CONNECTORS

Care **MUST** be taken when installing the cable connectors. Several conditions from poor workmanship will either cause service problems during the initial installation or later through deterioration. Ensure the following issues are adhered to when installing connectors.

- INSPECT THE STRIPPED CABLE TO ENSURE THERE IS NO WIRE BRAID OR ALUMINIUM FOIL MAKING CONTACT WITH THE CENTER CONDUCTOR AND ALSO, ENSURE THE CENTER CONDUCTOR IS STRIPPED CLEAN OF THE PLASTIC COATING.



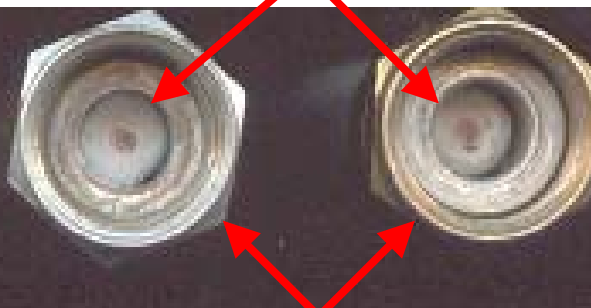
### Plastic coating on center conductor not removed

- May cause conductive problem when connected.
- Aluminum foil touching center conductor
- Will cause short circuit between the center conductor and sheath ground

- ENSURE CABLE DIELECTRIC IS SEATED FLUSH WITH CONNECTOR BASE AND IS FREE FROM FOREIGN MATERIAL SUCH AS THE STRANDS FROM THE COAX BRAID AND/OR ALUMINUM FOIL.



NOT ACCEPTABLE – COAX NOT FULLY SEATED IN CONNECTOR



# Cable / Connector Standards

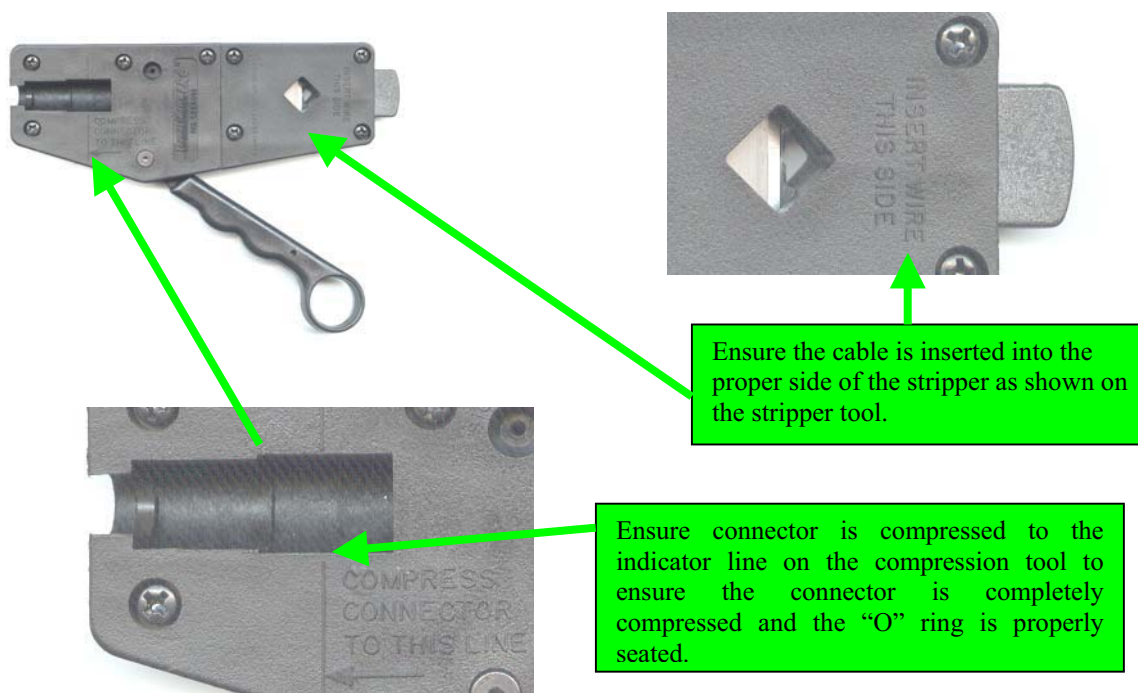
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## 3.2 CABLE CONNECTORS cont'd

The connectors illustrated below are 2 types of connectors recommended for Star Choice installations:



Only Star Choice approved cable connectors can be used to connectorize the coax cables. The 2 samples above are used for RG6 and RG59 cable. Both are weatherproof connectors that have inner and outer rubber “O” rings and they should be inspected to ensure they are free from dirt and the “O” rings are properly seated. The RG59 connectors are ONLY used to re-connectorize existing RG59 cable that cannot be replaced with RG6 coaxial cable.





# Cable / Connector Standards

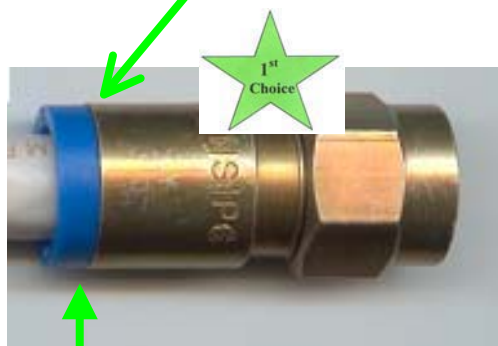
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## 3.2 CABLE CONNECTORS cont'd

### CONNECTORIZED RG6 COAXIAL CABLE



Connector NOT fully compressed resulting in "O" ring not seated into connector body.



Connector properly compressed and "O" ring is seated into connector body to provide optimum protection against moisture.



An improperly seated "O" ring

Will result in this.



The samples below are jumper cables that were found between the Star Choice satellite receiver and the customer's equipment (TV and VCR) causing service problems.



INSPECT ALL EXISTING CABLES AND CONNECTORS



# Cable / Connector Standards

Issued 5/12/02

## 3.3 CONNECTOR WEATHERPROOFING - GROMMETS

Rubber grommets are to be installed on ALL exterior connections to protect the connection from moisture and eventual corrosion causing deterioration of the connection and eventual loss of service.

There are two (2) lengths of grommets used for protecting coaxial cable connections. The short grommet is used on most connectors such as LNB, ground blocks and one side of the F81 connector.

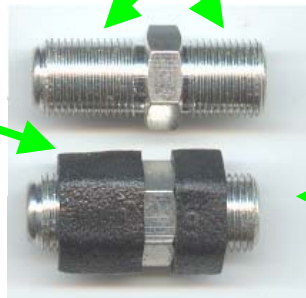
THE GROMMETS ARE TAPERED AND THE WIDER SIDE IS PLACED NEXT TO THE CONNECTOR CHASSIS.



- F81 connectors**

Note the difference lengths of the F81 connector

Tapered towards connector end.



### PROPERLY INSTALLED GROMMETS

- Correct lengths used
- Tapered side faces connector end
- Short grommet is NOT cut from longer one
- Proper high frequency F81 used as indicated by RED inner body.



### Wrong length grommet used

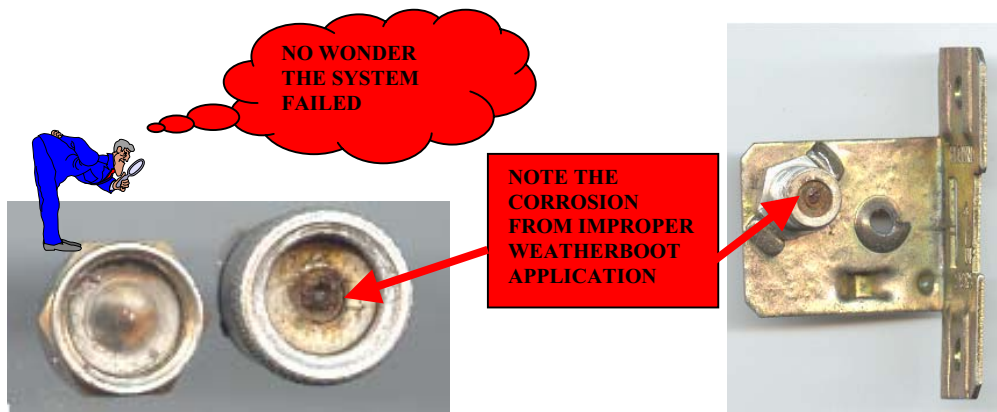
- Connector threads exposed
- Moisture will occur due to poor seal

# Cable / Connector Standards

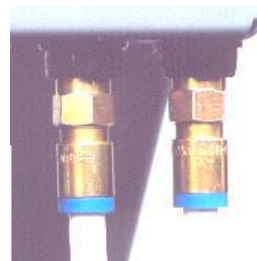
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## 3.3 CONNECTOR WEATHERPROOFING - GROMMETS cont'd

### RESULTS OF IMPROPERLY TIGHTENED CONNECTOR OR IMPROPERLY INSTALLED GROMMET



- LNB (WEATHER COVER REMOVED)



- DUAL GROUND BLOCK



- ✓ Grommets properly installed
- ✓ Grommets tapered toward connector end
- ✓ Connectors wrench tightened
- ✓ Connector properly compressed

# Cable / Connector Standards

Issued 5/12/02

## 3.3 CONNECTOR WEATHERPROOFING - GROMMETS cont'd

The rubber grommets illustrated in the previous pages are the recommended standard method for weatherproofing outside cable connectors. The combination of the approved weatherproof connector and the rubber grommet will provide the necessary protection against moisture and subsequent connector damage and loss of service.

Other methods of waterproofing such as weather boots that slide over the connector have been known to capture and retain moisture causing the connector to corrode and cause service failure. DO NOT use this type of connector weatherproofing and when found in existing exterior wiring, they should be removed and replaced with the Star Choice approved weatherproof connector and rubber grommet.

Previous Star Choice systems utilizing the “Dual LNB” for stacked systems also provided a pair of coaxial cables with weather-boots and sub-standard connectors to connect between the Dual LNB and the 2X2 Dual Satellite Multi-switch.

In this case, cut off the connectors and replace them with the standardized Star Choice weatherproof connectors and rubber grommets. Also, when on service calls, check the type of system installed and if the Satellite Cables shown below were installed, take the time to replace the connectors with the approved connectors and grommets. This will prevent future service outages to the customer and additional expense to Star Choice by avoiding another costly service call.

**SATELLITE CABLES PROVIDED FOR DUAL LNB STACKED SYSTEMS.**



**NOTE THE POOR SEAL ON THE SUB-STANDARD CONNECTOR**



**CORROSION OF CENTER CONDUCTOR AND CONNECTOR DUE TO MOISTURE**



**REPLACE ALL CONNECTORS WITH APPROVED STAR CHOICE CONNECTORS AND GROMMETS**



## INSTALLATION HANDBOOK

### 4.0

#### SITE SURVEY

**“Where is the best location for the dish?”**



## **4.1 GENERAL**

This section ONLY covers the procedure for establishing the best location to mount the dish, while full installation details are covered under other sections in this Installation Handbook. You must be fully familiar with all other Sections in this Installation Handbook before attempting an installation

**Be aware and follow ALL safety practices...your life is in your hands.**

## **4.2 PLAN THE INSTALLATION**

**The installation should be planned as completely as possible during the site survey.** The dish location must be chosen and coordinated with the coaxial cable run(s) to the Star Choice satellite receiver(s) and television set(s) and the available mounting surfaces.

Customers MUST be consulted during the planning process and attention must be given to the customer's desires. Consideration must be given and the customer must be made aware of the following issues when selecting the dish location:

- **Customer acceptance must be obtained from the owner(s)** and not their children, baby sitters, tenants, etc. If required, re-book the installation when owners are present.
- Inform the customer that permission must be obtained when installing dishes on Condo and apartment type dwellings.
- Inform the customer that the Star Choice satellite MUST have an unobstructed "line-of-site" at all times. Obstructions such as buildings, trees, vehicles, people, etc., must be avoided and special attention must be given when trees are near the "line-of-sight". Trees grow at various rates and the goal is to install a dish in a location that will not be obstructed by growing trees for several years.
- Choose a location that is easily accessible in most weather conditions, as the dish may require snow to be cleaned off its surface or require servicing.
- Consideration must be given to the location of the Star Choice satellite receiver and the coaxial cable runs required to be installed between the dish and the satellite receiver. Refer to Section 7.0 "Wiring-Exterior" and 8.0 "Wiring-Interior" for guidelines and Star Choice standards when installing coaxial cables.
- Consideration must be given to wind loading, and as such, the dish MUST be mounted on a solid surface such as brick, concrete or cement block. When installing on siding or roofs care MUST be exercised due to the issue of the single stud/rafter availability for securing the mount. **(Refer to Section 5.0 "Dish Assembly/Mounting" for mounting guidelines and Star Choice Standards.**
- Ensure the customer agrees with the proposed dish location and coaxial cable run(s).

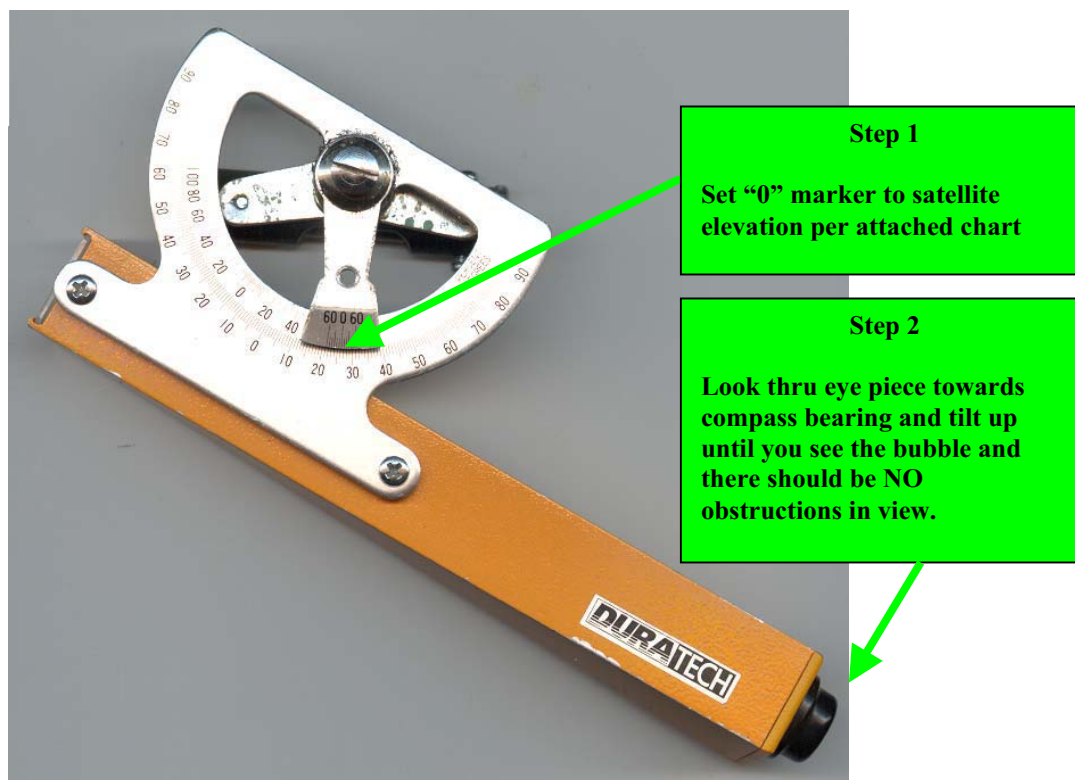
**INSTALL THE DISH AND CABLE RUNS AS YOU WOULD EXPECT THEM TO  
BE INSTALLED ON YOUR OWN HOME**



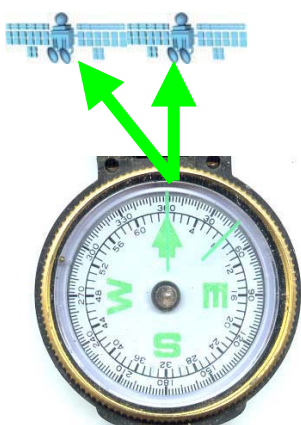
## 4.3 TOOLS NEEDED TO SUCCEED

Your survey tools should consist of the following:

- Compass azimuth and Dish elevation readings (refer to “Dual Satellite Locator Chart” in attachment 4.1.
- Abney Level or **equivalent**



- Compass



- Obtain compass bearing from “Satellite Locator Chart” attached.
- Ensure you are several feet away from any metallic objects that may influence the compass reading.
- Hold the compass so that the needle moves freely and turn until the needle arrow points to the compass bearing obtained in the 1<sup>st</sup> step above.

## 4.4 SURVEY CHECKLIST



Every installation must begin with a thorough site survey, one of the most critical yet often most neglected steps in satellite installations. The following procedure and items provide a quick checklist that can be followed when selecting the best location of the satellite dish and prevent unexpected difficulties that may be encountered:

- ✓ On your arrival to the customers home, take a moment to get your bearings using your compass to obtain the general direction of the Star Choice satellites.
- ✓ Greet the customer and introduce yourself, be pleasant and smile...a happy installer provides confidence to the customer.
- ✓ This is the best time to consult the customer if they own or rent the home. If the home is owned proceed with the installation however, if it is rented ensure the customer has permission to install the satellite dish and coaxial cable runs explaining to the customer that you will be drilling holes in the exterior wall(s), installing cable(s) from the dish to the satellite receiver and drilling entry hole(s) into the home.
- ✓ Ask the customer to show you the location(s) of the TV set(s) and also the existing cable entry point(s) or cable distribution point if there is or was an existing TV service.
- ✓ Advise the customer that you will be doing an exterior site survey to determine the best location to mount the satellite dish. Advise the customer that it may include ladders on the side of the home and possibly climbing onto the roof. **This is the best time to consult the customer if there are any restrictions or preferences pertaining to the dish location or coaxial cable runs.**
- ✓ With your compass, abney level and satellite coordinates in hand, survey the customers home to determine the best clear “line-of-site” that will be unobstructed by trees, future tree growth, buildings or any other obstructions.

## 4.4 SURVEY CHECKLIST cont'd

As with all satellite installations there are good points to follow that we will call **1<sup>st</sup> choice points** and there are bad points or precautions that we will call **bad choice points**.



- ✓ Ensure the installation conforms to any local building codes, condo restrictions, apartment restrictions and the customer has agreed to the proposed installation.
- ✓ Choose a dish location that will be easily accessible in most weather conditions, as it may require snow or other debris to be cleaned off or may require future service.
- ✓ Only install the satellite dish on a solid surface such as brick, concrete, concrete block, and when installed on walls or roofs with wood or other such material ensure the dish mount is secured to a wall stud, roof rafter or other solid foundation material.



- ✓ DO NOT install the dish on vinyl or aluminum siding as the siding will be crushed before the mount can be securely fastened to the wall stud.
- ✓ AVOID installing the dish in locations that may be exposed to high winds.
- ✓ DO NOT install the dish where it can be bumped or blocked by people, vehicles or any other moveable obstructions.
- ✓ DO NOT secure the dish to any wall surface where the foundation material is not solid, unless the dish mount can be secured to a wall stud, roof rafter or other solid foundation material.
- ✓ AVOID installing the dish on fence or balcony railings.
- ✓ DO NOT install the dish near hydro lines or hydro stacks.
- ✓ DO NOT install the dish on tripods unless the tripod has sufficient ballast to prevent the dish from being moved.
- ✓ DO NOT install the dish on pipe mounts that cannot be supported within 3 feet of the dish due to movement in strong winds.
- ✓ DO NOT install a dish based on the neighbors location...do your own survey.

**Following the above guidelines in your planning stage will avoid unexpected difficulties and unnecessary service calls at a later date.**

## 4.5 ESTABLISH “LINE-OF-SITE”

Using the coordinates provided in “attachment 4.1” follow the following few steps:

- Using the compass determine a clear “line-of-site” in the direction of the 2 satellites.

The example below is for London, Ontario with the following Azimuth coordinates:

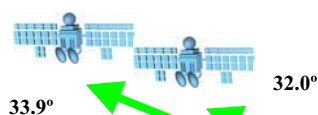
**Sat “A” 224° and Sat “B” 229°**



### REMEMBER

**DO NOT STAND NEAR METAL BUILDINGS, VEHICLES, ETC AS IRON CONTAINING OBJECTS WILL INFLUENCE THE COMPASS AND PROVIDE INACCURATE READINGS.**

- If there are any objects in view, use the abney level and the elevation coordinates provided in attachment 4.1 to determine if the object will obstruct the “line-of-site”. London elevations are: **Sat “A” 33.9° and Sat “B” at 32°**

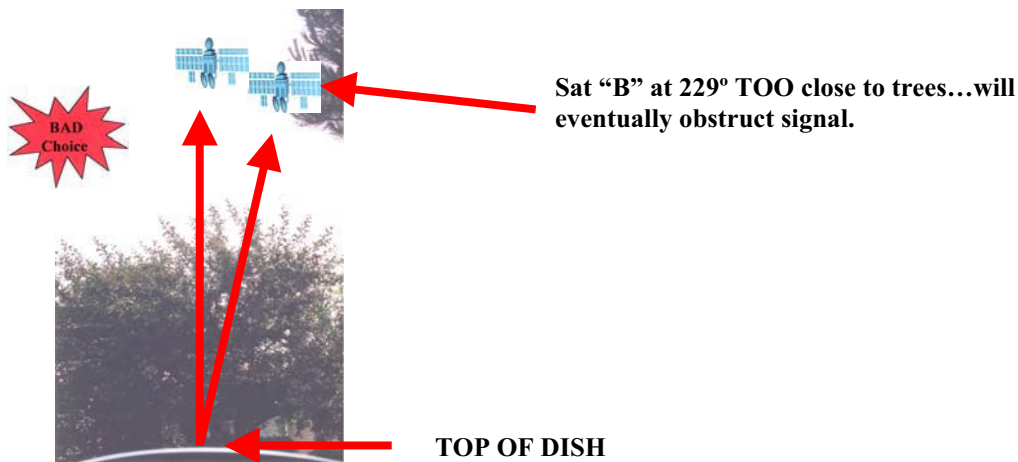


**Set abney level to 33.9 and check for clear “line-of-site” at 224° then set abney level to 32 and check again at 229°**



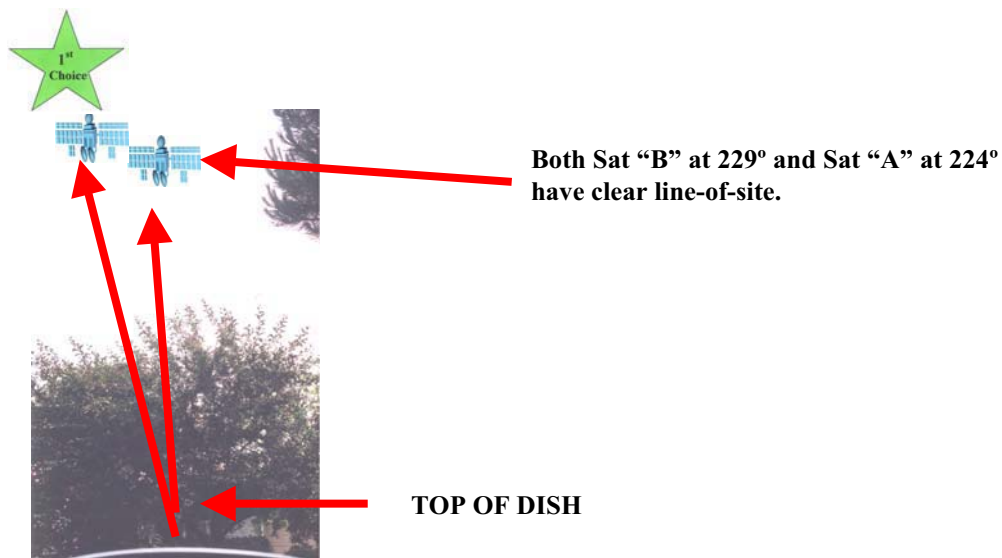
## 4.6 LINE OF SITE EXAMPLES

### 4.6.1 EXAMPLE 1



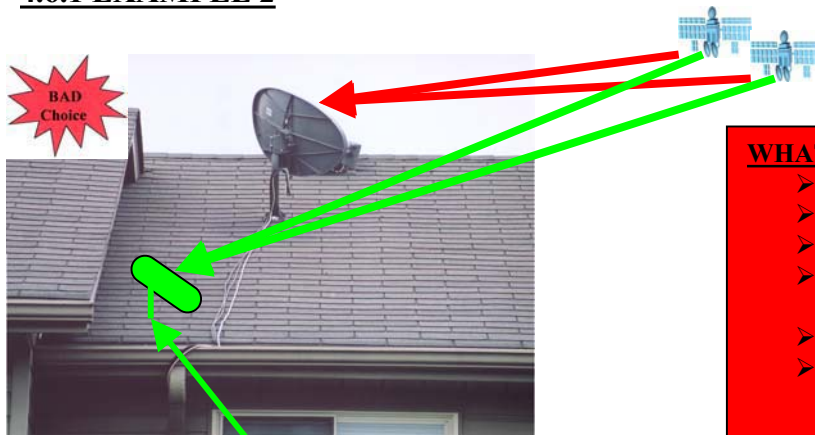
AS YOU CAN SEE FROM THE ABOVE EXAMPLE, SAT "B" IS PARTIALLY BLOCKED OR WILL BE BLOCKED BY THE TREES ON THE RIGHT SIDE OF THE PHOTO....NOT ACCEPTABLE.

**AT THIS POINT YOU MUST MOVE TO ANOTHER LOCATION ON THE HOME TO OBTAIN A CLEAR VIEW OF BOTH SATELLITES AS SHOWN BELOW.**



## 4.6 LINE OF SITE EXAMPLES cont'd

### 4.6.1 EXAMPLE 2



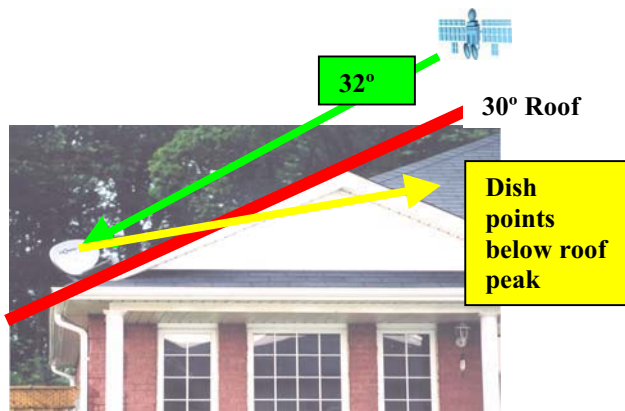
Preferred location of dish

#### WHAT'S WRONG WITH THIS INSTALL?

- Dish too high on roof
- Aesthetically unacceptable
- Worked on roof when not required
- Lost time due to climbing on/off roof
- Cables on roof unnecessarily
- Installer could have worked from ladder...safety issue!!!

WOULD YOU BE HAPPY WITH THE ABOVE INSTALLATION ON YOUR HOME?

UNDERSTANDING "BASIC SATELLITE FUNDAMENTALS" DESCRIBED IN SECTION 2.0 AND SHOWN BELOW, WOULD HAVE PREVENTED THE ABOVE UNACCEPTABLE INSTALLATION.



A PROPER SITE SURVEY  
AND  
UNDERSTANDING THE "BASIC  
SATELLITE FUNDAMENTALS"  
FROM SECTION 2.0 RESULTS IN A  
PROFESSIONAL LOOKING  
INSTALLATION SHOWN BELOW!!!



#### ACCEPTABLE INSTALLATION

- Dish mounted low on roof.
- No cables on roof.
- Aesthetically pleasing.
- Dish close to cable entry below dish (short cable run).
- Installer worked from ladder.
- Mount secured to roof rafter.



## 4.6 LINE OF SITE EXAMPLES cont'd

### 4.6.1 EXAMPLE 3

#### NEW INSTALL – SITE SURVEY



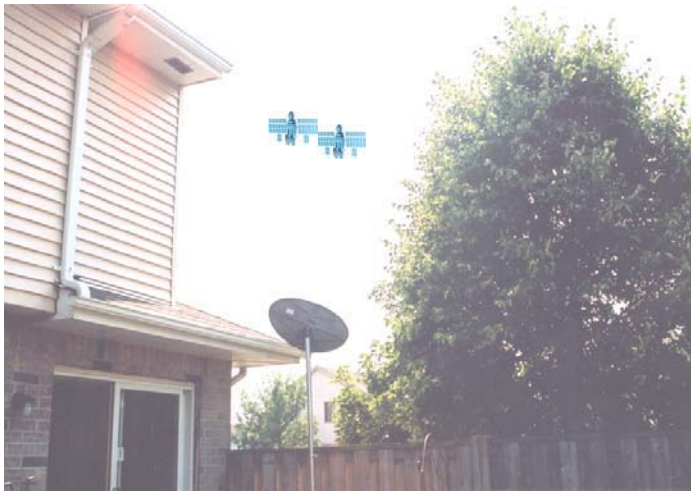
#### CONDITIONS:

- HOME IS RENTED
- TOWN HOUSE INSTALLATION
- CANNOT ATTACH DISH TO STRUCTURE

#### WHERE WOULD YOU INSTALL THE DISH?

Existing cable entry point located beside door.

#### SAME HOME AS ABOVE WITH ACCEPTABLE SITE SURVEY AND INSTALLATION.



#### NOTE

Although it is not recommended to mount dishes on fences the property management restrictions left no other alternative. (Refer to guidelines in Section 5.0 when mounting to fences.)

#### PROPER SITE SURVEY AND ACCEPTABLE INSTALLATION

- Restriction complied with, by not installing dish on roof.
- Dish NOT mounted on fence railing.
- Pipe mount securely fastened to fence at two points.
- Short cable run to existing cable entry point.
- Clear line-of-site to both satellites.
- Mast/dish secured to fence, within 60 cm (2 ft.) of fence post secured to structure.

## ATTACHMENT 4.1

### PAGE 1 OF 5

## Dual Satellite Locator Chart

Satellite Look angles are listed for both the 107.3W deg & 111.1W deg satellites. Use the settings for SAT B for dual satellite dish aiming. The reception of satellite signals in areas with a dish elevation less than 12 degrees may not be possible. Consult with your Star Choice retailer in your area. All information is listed in degrees.

Town/City	Satellite 'A'			Satellite 'B'			Town/City	Satellite 'A'			Satellite 'B'		
	Compass Azimuth	Dish Elevation	Dish Skew	Compass Azimuth	Dish Elevation	Dish Skew		Compass Azimuth	Dish Elevation	Dish Skew	Compass Azimuth	Dish Elevation	Dish Skew
<b>Newfoundland</b>							<b>Quebec</b>						
Bonavista	264	14.4	126	267	12.1	127	Oromocto	250	23.9	123	253	21.6	125
Cartwright	262	13.8	120	265	11.9	121	Plaster Rock	249	23.6	121	252	21.5	123
Corner Brook	260	17	124	263	14.8	125	St. John	250	24	123	254	21.7	125
Gander	263	15	125	266	12.8	126							
Grand Falls	262	15.7	125	265	13.5	126	Alma	242	24.7	118	246	22.7	120
Hebron	259	13.6	114	262	12	115	Amos	231	27.6	114	235	25.9	116
Indian Harbour	262	13.6	119	265	11.7	120	Anticosti	254	19.6	121	258	17.5	123
Labrador City	251	19.1	116	254	17.3	118	Asbestos	242	26.9	120	246	24.9	122
Nain	258	14.4	116	262	12.7	117	Baie Comeau	248	22.4	119	251	20.4	121
North West River	259	15.5	119	262	13.6	120	Baie St.Paul	244	24.9	119	248	22.9	121
Nutak	259	13.8	115	262	12.2	116	Asbestos	242	26.9	120	246	24.9	122
Placentia	263	15.5	127	266	13.2	128	Beattyville	232	26.9	114	237	25.2	116
Port aux Basques	258	18.5	125	262	16.2	126	Cap-de-la-Madeleine	241	26.8	119	245	24.7	121
Rigolet	261	14.3	119	264	12.4	120	Charlesbourg	243	25.7	119	247	23.7	121
Schefferville	251	17.8	115	255	16.1	116	Chibougamau	238	24.9	115	242	23.1	117
St. Anthony	262	14.4	122	266	12.3	124	Chicoutimi	243	24.4	118	247	22.5	120
St. John's	264	14.6	127	267	12.3	128	Cowansville	240	27.8	120	244	25.7	122
Trepassey	263	15.4	128	267	13.1	129	Dolbeau	241	24.7	117	245	22.8	119
Wabush City	251	19	116	254	17.2	118	Donnacona	242	26.1	119	246	24.1	121
<b>Nova Scotia</b>							Dosquet	242	26.2	119	246	24.1	121
Bridgewater	252	23.7	125	256	21.3	127	Drummondville	241	27.1	119	245	25.1	121
Cape Breton Is.	256	20.5	125	260	18.2	127	Eastmain	231	24.5	111	235	23	113
Chesterfield In.	208	17.5	98	212	16.9	100	Festubert	240	26.2	118	244	24.2	120
Dartmouth	254	22.9	125	257	20.6	127	Fort Coulonge	233	29.3	117	237	27.4	119
Freeport	250	24.8	124	254	22.5	126	Gagnon	248	20.4	117	252	18.6	118
Mulgrave	256	21	125	259	18.6	127	Gaspe	253	20.7	121	256	18.6	123
Port Hawkesbury	256	21	125	260	18.6	127	Gatineau	235	29.1	118	239	27.1	120
Port Maitland	250	24.9	125	254	22.5	127	Granby	240	27.6	120	244	25.6	122
Sable Is.	258	21.1	128	261	18.6	129	Grand Mere	241	25.1	117	245	23.2	119
Shelburne	251	24.6	125	255	22.2	127	Hauterive	248	22.5	119	251	20.5	121
Sydney	257	19.9	125	261	17.6	127	Hull	235	29.1	118	239	27.2	120
Truro	254	22.3	125	257	20	126	Inukjuak	235	19	107	239	17.8	109
Wedgeport	250	25	125	254	22.6	127	Ivujivik	240	15.4	105	244	14.4	106
Yarmouth	250	25	125	254	22.7	127	Joliette	239	27.5	119	243	25.5	121
<b>Prince Edward Island</b>							Kuujuaq	252	15.8	112	256	14.4	113
Charlottetown	254	21.7	124	258	19.4	126	Kuujuarapik	234	21.5	109	238	20.1	111
<b>New Brunswick</b>							La Sarre	228	27.8	113	233	26.2	115
Bath	248	24	122	252	21.9	123	La Tuque	240	26.1	118	244	24.1	120
Bathurst	251	22.2	122	255	20.1	123	Levis	243	25.7	119	247	23.7	121
Chatham	251	22.5	122	255	20.3	124	Madeleine	256	20.1	124	259	17.8	125
Dalhousie	250	22.3	121	254	20.2	123	Malartic	230	28	114	235	26.2	116
Edmundston	247	23.8	120	251	21.7	122	Maniwaki	235	28.5	117	239	26.6	119
Fredericton	250	23.9	123	253	21.7	124	Matagami	232	26.5	113	236	24.8	115
Grand Manan Is.	249	24.9	124	253	22.6	126	Matane	249	22.3	120	252	20.3	121
Hartland	248	24.1	122	252	22	124	Mingan	253	19.5	120	257	17.5	122
Kedgwick	249	23.1	121	252	21	123	Miquelon	234	26.2	114	238	24.5	116
Moncton	252	22.7	123	256	20.5	125	Mistassini	241	24.6	117	245	22.8	119
Napadogan	249	23.8	122	253	21.6	124	Monet	235	26.8	115	239	25	118
Newcastle	251	22.6	122	255	20.4	124	Mont Laurier	235	28.1	117	239	26.2	119
							Mont Louis	251	21.1	120	255	19.1	122
							Montmagny	244	25.3	120	248	23.2	122



## ATTACHMENT 4.1

### PAGE 2 OF 5

Town/City	Satellite 'A'			Satellite 'B'			Town/City	Satellite 'A'			Satellite 'B'		
	Compass Azimuth	Dish Elevation	Dish Skew	Compass Azimuth	Dish Elevation	Dish Skew		Compass Azimuth	Dish Elevation	Dish Skew	Compass Azimuth	Dish Elevation	Dish Skew
Montreal	239	28	119	243	26	121	Belleville	232	31	117	236	29	120
Mont Joli	247	22.9	119	251	20.9	121	Blind River	220	31.6	112	225	30	115
Natashquan	256	18.4	121	260	16.3	123	Bracebridge	228	31.2	115	232	29.3	118
Noranda	229	28.2	113	233	26.5	116	Bradford	228	32.1	116	232	30.2	119
Parent	237	26.6	116	241	24.7	119	Brampton	227	32.6	116	232	30.7	119
Paspebiac	251	21.7	121	255	19.6	123	Brockville	235	29.8	118	239	27.8	121
Pointe aux Anglais	249	21.6	119	253	19.6	121	Burlington	227	32.9	116	232	31	119
Pointe-aux-Tremble	239	27.8	119	243	25.8	121	Carleton Place	234	29.6	117	238	27.6	120
Port Cartier	250	21.2	119	253	19.2	121	Chapleau	220	30.4	110	224	28.9	113
Quaqtaq	253	14.1	109	256	12.8	110	Chatham	223	34.8	115	227	33	118
Quebec	243	25.8	119	247	23.7	121	Cobalt	227	29.3	113	232	27.6	116
Rimouski	247	23.1	119	251	21.1	121	Cobourg	230	31.6	117	235	29.6	120
Riviere-du-Loup	245	24.1	119	249	22.1	121	Cochrane	225	28.3	111	229	26.8	114
RivierePentecote	249	21.5	119	253	19.5	121	Collingwood	226	32.1	115	231	30.2	118
Roberval	241	25	117	245	23.1	119	Cornwall	237	29	119	241	26.9	121
Rouyn	229	28.2	113	233	26.5	116	Dalton	218	30.3	110	223	28.8	112
Salluit	244	15	106	248	14	107	Deep River	232	29.4	116	236	27.6	118
Senneterre	232	27.3	114	236	25.6	117	Dryden	198	31.1	102	203	30.3	105
Sept Iles	250	20.8	119	254	18.8	121	Elliot Lake	221	31.3	112	226	29.7	115
Shawinigan	240	26.7	119	244	24.7	121	Emsdale	228	30.7	115	232	28.9	118
Sheldrake	252	20	120	256	18	121	English River	202	31.4	104	207	30.3	107
Sherbrooke	242	27.2	120	246	25.1	122	Espanola	223	31.2	113	227	29.5	115
Sorel	240	27.3	119	244	25.3	121	Foleyet	222	29.8	111	226	28.2	114
St Paul du Nord	246	23.5	119	250	21.5	121	Fort Albany	224	25.6	109	229	24.3	111
St. Agathe-des-Monts	238	27.9	118	242	26	120	Fort Frances	197	32.6	102	202	31.6	105
St. Agapit	242	26	119	246	24	121	Fort Severn	212	23.8	103	216	22.9	105
St. Anne de Beaupre	243	25.5	119	247	23.4	121	Gananoque	234	30.2	118	238	28.2	121
St. Augustin	259	16.1	121	263	14.1	123	Geraldton	212	29.8	107	216	28.5	109
St. Boniface	188	32	99	193	31.3	102	Gilmour	231	30.6	117	236	28.7	119
St. Eloi	246	23.8	119	250	21.8	121	Goderich	223	33.4	115	228	31.6	117
St. Hyacinthe	240	27.6	119	244	25.5	121	Gogama	223	29.9	112	228	28.3	114
St. Jean	239	28	119	243	25.9	122	Gravenhurst	229	31.1	116	233	29.3	118
St. Jerome	238	28	118	242	26	121	Guelph	226	32.9	116	231	31	119
St. Jean de Matha	239	27.4	118	243	25.4	121	Haliburton	231	30.6	116	235	28.7	119
St. Laurent	239	28	119	243	26	121	Hamilton	227	33	116	232	31.1	119
St. Pacome	245	24.7	119	249	22.6	121	Hanover	225	32.7	115	229	30.9	118
St. Pascal	245	24.5	119	249	22.4	121	Hearst	219	28.7	109	224	27.3	112
St. Simeon	245	24.3	119	249	22.3	121	Hornepayne	217	29.5	108	221	28.2	111
St. Stephen	249	24.8	123	252	22.5	125	Huntsville	228	30.9	115	233	29.1	118
Tadoussac	245	24	119	249	22	121	Ignace	201	31.4	103	205	30.3	106
Trois-Rivieres	241	26.8	119	245	24.8	121	Ingersoll	225	33.7	116	230	31.8	119
Val d'Or	231	27.8	114	235	26.1	116	Iroquois Falls	225	28.4	112	230	26.9	114
Valleyfield	238	28.5	119	242	26.4	121	Kapuskasing	222	28.5	110	226	27.1	113
Vandry	239	26.1	117	243	24.2	119	Kenora	194	31.6	101	199	30.7	104
Verdun	239	28	119	243	26	121	Kincardine	223	33	114	228	31.2	117
Victoriaville	242	26.7	119	246	24.6	122	Kingston	234	30.5	118	238	28.5	121
Waskaganish	230	25.3	111	234	23.8	113	Kirkland Lake	227	28.7	113	231	27.1	115
Wemindji	231	24	110	235	22.5	112	Kitchener	226	33.1	116	230	31.2	119
Windsor	241	27.1	120	245	25	122	Lindsay	229	31.5	116	234	29.6	119
<b>Ontario</b>							Little Current	223	31.5	113	227	29.8	115
Apsley	231	30.8	116	235	28.9	119	London	224	33.9	115	229	32	118
Arnprior	234	29.4	117	238	27.5	120	Longlac	213	29.5	107	218	28.3	110
Bancroft	231	30.5	116	235	28.6	119	Lynx	214	29.1	107	218	27.8	110
Barrie	227	31.9	116	232	30	118	Macdiarmid	209	30.4	106	214	29.2	109
							Madoc	232	30.8	117	236	28.8	120
							Magog	241	27.4	120	245	25.3	122
							Manitoulin I.	221	31.9	112	226	30.3	115
							Matachewan	225	29.2	112	230	27.6	115
							Mattawa	229	29.8	115	234	28	117
							Mattice	220	28.7	109	224	27.2	112

**ATTACHMENT 4.1****PAGE 3 OF 5**


Town/City	Satellite 'A'			Satellite 'B'			Town/City	Satellite 'A'			Satellite 'B'		
	Compass Azimuth	Dish Elevation	Dish Skew	Compass Azimuth	Dish Elevation	Dish Skew		Compass Azimuth	Dish Elevation	Dish Skew	Compass Azimuth	Dish Elevation	Dish Skew
Mekatina	218	31.4	110	223	29.9	113	Temiscaming	229	29.6	114	233	27.9	117
Michipicoten	216	30.8	109	221	29.4	112	Thessalon	219	31.8	111	224	30.2	114
Midland	227	31.7	115	231	29.9	118	Thetford Mines	243	26.3	120	247	24.3	122
Milne Inlet	259	7.1	98	263	6.6	99	Thunder Bay	206	31.7	106	211	30.5	108
Mobert	215	30.4	108	219	29	111	Timmins	224	29	111	228	27.4	114
Moosonee	226	26.2	110	230	24.7	112	Tionaga	222	29.6	111	227	28.1	114
Nakina	212	29.2	107	217	28	109	Tobermory	223	32	113	228	30.3	116
New Liskeard	227	29.2	113	232	27.5	116	Toronto	228	32.4	116	232	30.5	119
Newcastle	230	31.8	117	234	29.9	119	Trenton	232	31.1	117	236	29.2	120
Nipigon	209	30.9	106	213	29.7	109	Trout Creek	228	30.4	115	232	28.6	117
North Bay	228	30.1	114	232	28.4	117	Wallaceburg	222	34.7	115	227	32.9	118
Oakville	227	32.7	116	232	30.8	119	Waterloo	226	33.1	116	230	31.2	118
Oba	218	29.5	109	223	28.1	112	Welland	228	32.9	117	233	31	120
Opasatika	221	28.6	110	225	27.1	112	Whitby	229	32	117	233	30.1	119
Orillia	228	31.6	116	232	29.7	118	Whitney	230	30.3	116	234	28.4	118
Oshawa	229	31.9	117	233	30	119	Windsor	221	35.3	115	225	33.5	118
Ottawa	235	29.1	118	239	27.2	120	Wingham	224	33.1	115	229	31.3	118
Ottawa Is.	233	18.3	105	237	17.2	107	Winisk	217	23.9	105	222	22.8	107
Oulmet	208	31.2	106	213	30	109	Woodstock	225	33.5	116	230	31.6	119
Owen Sound	225	32.3	114	229	30.5	117	<b>Manitoba</b>						
Pagwa River	216	28.9	108	220	27.6	110	Brandon	182	32.4	96	187	31.9	99
Parry Is.	194	5.4	91	198	5.3	92	Dauphin	181	31	96	186	30.5	99
Parry Sound	227	31.2	115	231	29.4	117	Emerson	188	32.9	99	193	32.2	102
Pembroke	232	29.5	116	237	27.6	119	Flin Flon	177	27.3	94	182	26.9	97
Penetanguishene	227	31.7	115	231	29.9	118	Gimli	188	31.2	98	193	30.5	101
Perth	234	29.8	118	238	27.9	120	Grand Rapids	183	28.8	96	188	28.3	99
Petawawa	232	29.5	116	236	27.6	119	Gypsumville	185	30.2	97	189	29.6	100
Peterborough	230	31.3	117	234	29.4	119	Hodgson	187	30.6	98	192	30	101
Pickle Crow	205	28.9	103	209	27.8	106	Lynn Lake	179	25	94	183	24.7	97
Pictou	232	31	118	237	29	120	Minnedosa	182	32	96	187	31.4	99
Port Nelson	200	23.7	99	204	22.9	102	Morden	186	32.8	98	191	32.2	101
Port Stanley	224	34.1	116	229	32.3	119	Portage la Prairie	185	32.1	98	190	31.4	101
Ramora	226	28.6	112	230	27	115	Norway House	186	27.8	97	191	27.2	100
Red Lake	196	30.2	101	201	29.3	104	The Pas	178	28.3	94	183	27.9	97
Renfrew	233	29.6	117	237	27.6	119	Thompson	186	25.9	97	191	25.3	99
Richmond Hill	228	32.2	116	232	30.3	119	Winnipeg	188	32	99	193	31.3	102
Sand Lake	217	30.8	110	222	29.4	112	York Factory	200	23.7	100	204	22.9	102
Sarnia	222	34.4	115	227	32.6	118	<b>Saskatchewan</b>						
Sault Ste Marie	217	31.9	111	222	30.4	113	Assiniboia	169	33.1	91	174	32.9	94
Savant Lake	203	30.2	104	208	29.1	106	Beauval	165	27.1	90	169	27	93
Schreiber	211	30.8	107	215	29.5	110	Biggar	165	30.4	90	170	30.4	92
Simcoe	226	33.6	116	231	31.6	119	Estevan	175	33.5	94	180	33.1	97
Sioux Lookout	200	30.7	103	205	29.7	106	Fond du Lac	164	22.6	90	168	22.6	92
Smiths Falls	234	29.7	118	239	27.7	120	Kamsack	177	30.8	94	182	30.4	97
Steep Rock Lake	201	32	103	206	30.9	106	La Ronge	169	27.1	91	174	26.9	94
St. Catharines	228	32.8	117	233	30.8	120	Lloydminster	161	29.1	88	165	29.1	91
St. Thomas	224	34	116	229	32.2	119	Maple Creek	162	32.7	88	167	32.8	91
Stokes Bay	224	32.2	114	228	30.4	117	Melfort	171	29.5	92	176	29.3	95
Stratford	225	33.4	115	229	31.5	118	Moose Jaw	170	32.2	91	175	32	95
Sturgeon Falls	227	30.3	114	231	28.5	117	Nokomis	171	31	92	176	30.8	95
Sudbury	225	30.6	113	229	28.9	116	North Battleford	164	29.7	89	169	29.6	92
Sultan	221	30.3	111	225	28.8	114	Regina	172	32.1	92	177	31.8	95
Swastika	227	28.8	113	231	27.2	115	Rosetown	165	31	90	170	30.9	93
Tannin	202	31	104	207	29.9	106	Rosthern	168	29.8	91	173	29.6	94
							Saskatoon	167	30.3	91	172	30.2	94



## ATTACHMENT 4.1

### PAGE 4 OF 5

Satellite 'A'				Satellite 'B'			Satellite 'A'				Satellite 'B'		
Town/City	Compass Azimuth	Dish Elevation	Dish Skew	Compass Azimuth	Dish Elevation	Dish Skew	Town/City	Compass Azimuth	Dish Elevation	Dish Skew	Compass Azimuth	Dish Elevation	Dish Skew
Shaunavon	165	33	89	169	33	92	Hazelton	133	24.5	77	137	25.3	79
Sherridon	178	24.8	94	183	24.4	97	Hudson Hope	140	24.8	80	144	25.4	83
Stanley	170	26.4	92	175	26.2	94	Kamloops	144	30.7	79	149	31.3	82
Swift Current	166	32.4	90	170	32.3	93	Kelowna	145	31.7	80	150	32.3	83
Tisdale	173	29.5	93	177	29.2	95	Kitimat	132	25.3	75	136	26.2	78
Uranium City	161	22.4	89	165	22.4	91	Ladysmith	139	31.6	76	144	32.5	79
Watrous	170	30.8	91	175	30.6	95	Lillooet	141	30.3	78	146	31	81
Weyburn	174	32.9	93	179	32.6	96	McLeod Lake	139	25.7	79	143	26.4	82
Wilkie	163	30	89	168	30	92	Nanaimo	139	31.4	76	144	32.3	79
Yorkton	176	31.2	94	181	30.8	97	Nelson	149	32.4	82	154	32.9	85
Alberta							New Westminster	140	31.6	77	145	32.4	80
Athabasca	154	27.3	86	159	27.5	89	Penticton	145	32	80	150	32.7	83
Banff	151	30.9	83	156	31.3	86	Port Alice	134	29.2	74	139	30.2	77
Bassano	157	31.6	86	162	31.8	89	Port Renfrew	138	31.9	75	143	32.9	79
Brooks	158	31.9	86	163	32	89	Prince George	139	26.8	79	144	27.5	82
Calgary	154	31.2	85	159	31.4	88	Prince Rupert	130	24.7	74	134	25.7	77
Camrose	156	29.2	86	160	29.4	89	Quesnel	140	27.8	79	145	28.5	82
Cranbrook	151	32.7	83	156	33.1	86	Queen Charlotte Is	127	25.1	72	132	26.3	75
Drumheller	156	30.9	86	161	31.1	89	Revelstoke	147	30.7	81	152	31.2	84
Edmonton	154	28.6	86	159	28.8	88	Saanich	140	32.2	76	145	33.1	79
Edson	149	28.2	83	154	28.6	86	Sidney	140	32	76	145	32.9	79
Fort Chipewyan	156	23.2	88	161	23.2	90	Simoom Sound	135	29	75	139	30	78
Fort MacKay	156	24.8	87	160	24.9	90	Squamish	140	31	77	145	31.9	80
Fort McMurray	157	25.3	87	161	25.4	90	Stewart	130	23.1	75	134	24.1	78
Fort Vermilion	148	23.2	85	152	23.5	87	Telegraph Creek	128	20.9	76	132	21.8	78
Grande Prairie	145	26.2	82	149	26.7	85	Trail	148	32.8	81	153	33.4	84
Hanna	158	30.8	86	162	30.9	89	Vancouver Is.	136	30	75	141	30.9	78
Hines Creek	145	25.1	83	149	25.6	85	Vancouver	140	31.5	77	145	32.4	80
Jasper	147	28.7	82	151	29.2	85	Vernon	146	31.3	80	150	31.9	83
Lac la Biche	156	27.4	87	161	27.5	89	Victoria Beach	189	31	99	194	30.3	102
Lacombe	154	29.7	85	159	30	88	Victoria	140	32.3	76	145	33.1	79
Leduc	154	28.9	85	159	29.1	88	Williams Lake	141	28.8	79	146	29.5	82
Lethbridge	156	32.8	85	161	33	89	Nunavut						
McLennan	148	25.9	83	152	26.3	86	Amadjuak	252	12.8	106	255	11.7	107
Meander River	145	22.4	84	149	22.7	86	Arctic Bay	253	7.1	97	257	6.7	98
Medicine Hat	160	32.5	87	165	32.6	90	Bathurst Inlet	158	14.8	90	162	14.8	91
Peace River	147	25.3	83	151	25.7	86	Bathurst Is.	211	5.4	92	215	5.2	93
Red Deer	154	29.9	85	159	30.2	88	Cambridge Bay	165	12.4	91	169	12.3	92
Stettler	156	29.9	86	161	30.1	89	Cape Dyer	268	7.6	108	272	6.4	109
Vegreville	157	28.7	87	161	28.9	89	Cornwallis Is.	233	6.1	93	237	5.9	94
Vegreville	157	28.7	87	161	28.9	89	Devon Is.	261	5.4	96	265	5	97
Vermilion	159	29	87	164	29.1	90	Eskimo Point	197	19.8	97	201	19.3	99
Wetaskiwin	155	29.2	85	159	29.4	88	Frobisher Bay	257	11.7	107	261	10.5	109
British Columbia							Gjoa Haven	198	12.5	94	202	12.2	96
Ashcroft	142	30.4	79	147	31.1	82	Igloolik Is	247	10.3	100	251	9.6	101
Atlin	125	18.7	75	129	19.7	77	Kangirsuk	251	15	110	255	13.7	111
Chemainus	139	31.7	76	144	32.5	79	Lake Harbour	254	12.8	108	258	11.6	109
Courtenay	137	30.6	75	142	31.5	78	Mackenzie King Is.	134	4	89	138	4	90
Dawson Creek	142	25.4	81	147	26	84	Padlei	190	19.3	96	194	18.8	98
Duncan	139	31.9	76	144	32.7	79	Padloping Is	268	7.7	107	271	6.6	108
Esquimalt	140	32.2	76	145	33.1	79	Pangnirtung	264	9.2	107	267	8	108
Fort Grahame	136	23.9	79	141	24.6	81	Pelly Bay	223	11.9	97	227	11.4	98
Fort Nelson	138	21.9	81	142	22.5	83	Qurlurtuq	142	13.6	87	146	13.7	88
Ft St. John	141	24.8	81	146	25.4	83	Rankin Inlet	205	17.8	98	209	17.2	100
							Repulse Bay	228	13.4	99	232	12.7	100
							Resolute	231	6.5	93	235	6.2	94
							Resolution Is.	259	12.2	110	263	10.9	112
							Somerset Is.	226	8	94	230	7.7	95

The logo for Star Choice, featuring the word "STAR" in a large, bold, sans-serif font, followed by "CHOICE" in a smaller, bold, sans-serif font. A stylized star graphic is positioned between the two words.



# Site Survey

Issued 5/12/02

## ATTACHMENT 4.1

### PAGE 5 OF 5

Town/City	Satellite 'A'			Satellite 'B'			Notes
	Compass Azimuth	Dish Elevation	Dish Skew	Compass Azimuth	Dish Elevation	Dish Skew	
Southampton Is.	230	14.9	101	234	14.2	102	
Spence Bay	212	11.4	95	216	11	97	
Tavani	200	18.9	97	204	18.3	99	
Wager Bay	213	14.7	97	217	14.1	99	
Whale Cove	201	18.3	97	206	17.8	99	
<b>Northwest Territory</b>							
Arctic RedRiver	120	11.6	79	124	12.3	81	
Banks Is.	126	7.9	86	130	8.2	87	
Fort Franklin	132	15.3	83	136	15.8	84	
Fort Good Hope	126	13.6	81	130	14.2	82	
Fort Liard	136	20.3	81	140	20.9	83	
Fort Norman	130	15.4	82	134	15.9	83	
Fort Reliance	158	19	89	162	19	91	
Fort Simpson	138	19.1	83	142	19.6	85	
Fort Smith	154	21.8	87	159	21.9	90	
Ft McPherson	120	11.4	79	124	12.1	80	
Ft Providence	143	20	84	148	20.3	86	
Ft Resolution	150	20.5	87	155	20.7	89	
Hay River	147	20.7	85	151	20.9	87	
Holman Island	135	10.5	86	139	10.7	88	
Inuvik	120	10.9	80	124	11.5	81	
Jean Marie Rvr	139	19.4	83	143	19.9	85	
Melville Is.	144	6	89	148	6	90	
Nahanni Butte	135	19.5	81	140	20	83	
Norman Wells	129	14.8	81	133	15.3	83	
Port Radium	139	15.1	85	143	15.3	87	
Rae	145	18.6	86	149	18.8	87	
Snowdrift	155	19.4	88	159	19.4	90	
Tuktoyaktuk	120	10	81	124	10.5	82	
Victoria Is.	149	10.5	89	154	10.5	90	
Wrigley	134	17.3	82	138	17.8	84	
Yellowknife	148	19	86	152	19.2	88	
<b>Yukon Territory</b>							
Big Salmon	122	2216.3	76	127	17.2	78	
Carmacks	121	15.8	75	125	16.7	77	
Dawson	118	13.3	75	122	14.3	77	
Forty Mile	117	12.8	75	121	13.7	77	
Keno Hill	121	14.4	77	125	15.2	79	
Klondike	118	13.4	75	122	14.3	77	
Mayo Landing	121	14.5	77	125	15.3	78	
Old Crow	116	10.3	77	120	11.1	79	
Stewart River	118	14	75	122	14.9	76	
Tagish	124	17.9	75	128	18.9	77	
Teslin	125	18.5	76	129	19.3	78	
Watson Lake	129	19.4	78	134	20.2	80	
Whitehorse	123	17.4	75	127	18.3	77	
<b>Canadian Arctic Islands</b>							
Prince Charles Is.	254	10.3	102	258	9.5	103	
Prince of Wales Is	197	8.3	93	201	8.1	94	
Prince Patrick Is.	121	4.2	87	125	4.3	88	
Queen Elizabeth Is	256	2.9	92	259	2.8	93	

SAC-00-094





# ***Dish Assembly and Mounting***

Revised 24-07-03



## **INSTALLATION HANDBOOK**

### **5.0**

#### **60E cm DISH ASSEMBLY and MOUNTING STANDARDS**

# Dish Assembly and Mounting

Revised 24-07-03

## 5.1 GENERAL

By now you should have completed the following:

- ✓ Owner's permission to install system, for rental properties.
- ✓ Site survey.
- ✓ Customer agreement on all aspects of the installation.
- ✓ Clear understanding of all installation restrictions.

## 5.2 DISH ASSEMBLY PREPARATION

Find yourself a clear work area to assemble the dish and mount assembly that is free from walkways and children.



### CAUTION

It is not recommended to pre-assemble the dish and mount assemblies and store in your vehicle. The support arm with the new quad LNBs are easily damaged or broken when left unprotected, not to mention the amount of space required to store the assemblies in the back of your vehicle.

Once you have found a clear, work space, open the dish/mount hardware box and remove all hardware pieces.

To avoid losing any hardware components, the box serves as a useful container to keep the small hardware components together. The empty box also serves as a garbage disposal container for the hardware packaging bags, miscellaneous wire, unused promotional material and wire clippings, etc.



Screws, bolts, washers, clips etc can be kept together in the inside box.

Empty box serves as your garbage disposal container that should be taken with you when the installation is completed.



Ensure you have the following tools on-hand to complete the dish/mount assembly:

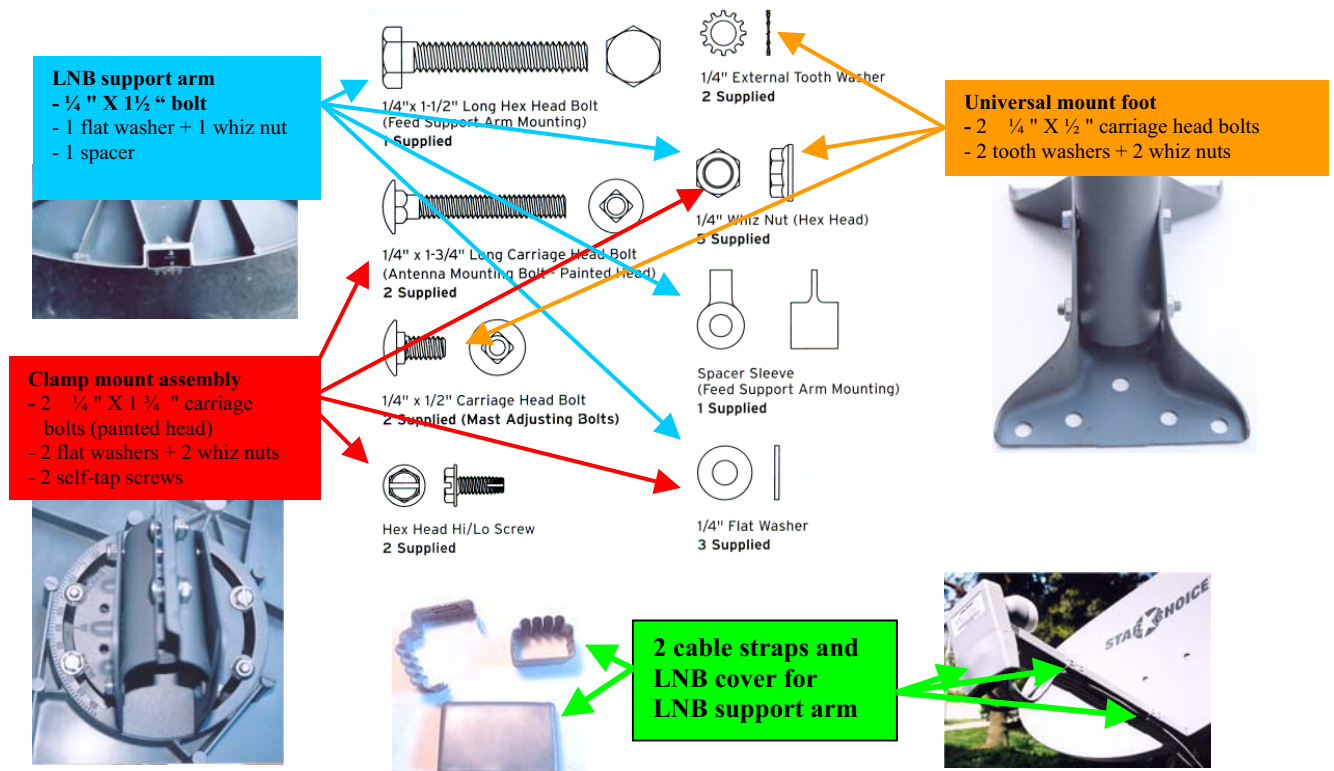
- ✓ #1 Philips screwdriver
- ✓ Two 7/16 in. open or combination wrenches.

# Dish Assembly and Mounting

Revised 24-07-03

## 5.2.1 DISH ASSEMBLY

Take inventory of the hardware package to ensure all bolts, washers etc, shown below are available.



With the reflector in a comfortable working position as shown below, install the "rear clamp mount assembly" to the rear of the reflector.

### Clamp mount assembly.

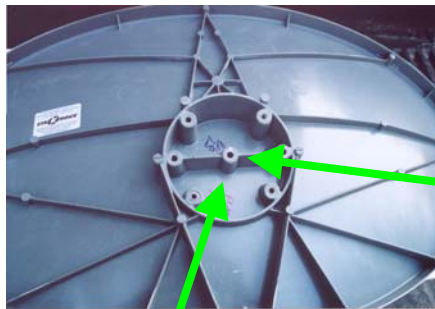


# Dish Assembly and Mounting

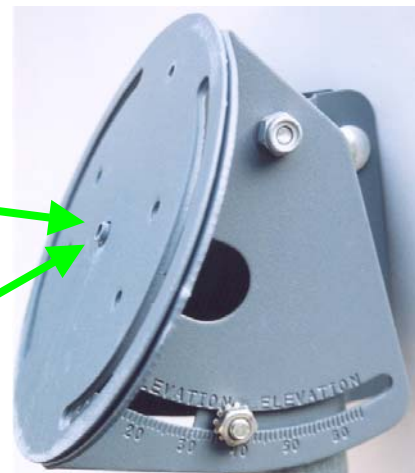
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## 5.2.1 DISH ASSEMBLY cont'd

When mounting the “clamp mount assembly” to the reflector ensure the center pivot pin on the clamp mount is seated into the pivot hole on the reflector. See diagram below:



Center pivot pin  
hole.



Center pivot pin.



### REMEMBER TO OBSERVE HAND TOOL SAFETY

- Insert the two ¼" X 1¾" long carriage head bolts (painted heads) through the front of the reflector and through the Clamp Mount Assembly as shown below.
- Install two flat washers and whiz nuts, then snug up the whiz nuts using a 7/16" wrench – **do not tighten.**
- Install the two hex head hi/lo self-tap screws into the clamp mount assembly and snug up – **do not tighten.**
- Turn the clamp mount assemble to set the skew for the area you are installing the system and also set the elevation adjustment. Refer to Section 4.0 Attachment 4.1 for the skew and elevation settings. Once the skew setting has been set, tighten the two, whiz nuts and screws. **Exercise care when tightening the two self-tap screws, as they strip if over-tightened. Also, tighten the two elevation adjustment nuts.**

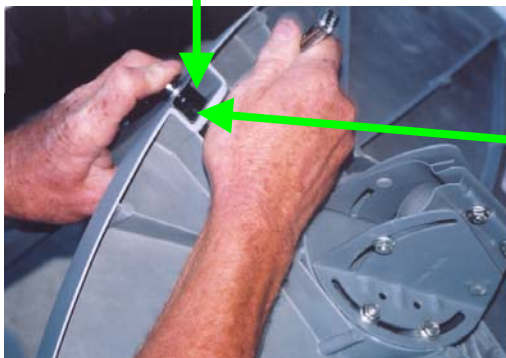


# Dish Assembly and Mounting

Revised 24-07-03

## 5.2.1 DISH ASSEMBLY cont'd

- Install the “feed support arm” using the ¼" X 1½" bolt, flat washer and whiz nut and spacer.
- Tighten the feed support arm using two 7/16" wrenches.
- **DO NOT FORGET THE SPACER.**



- Install the Quad LNB and tighten the Philips screw with the #1 Philips screwdriver.



✓ **THE DISH IS NOW ASSEMBLED AND READY TO BE INSTALLED.**



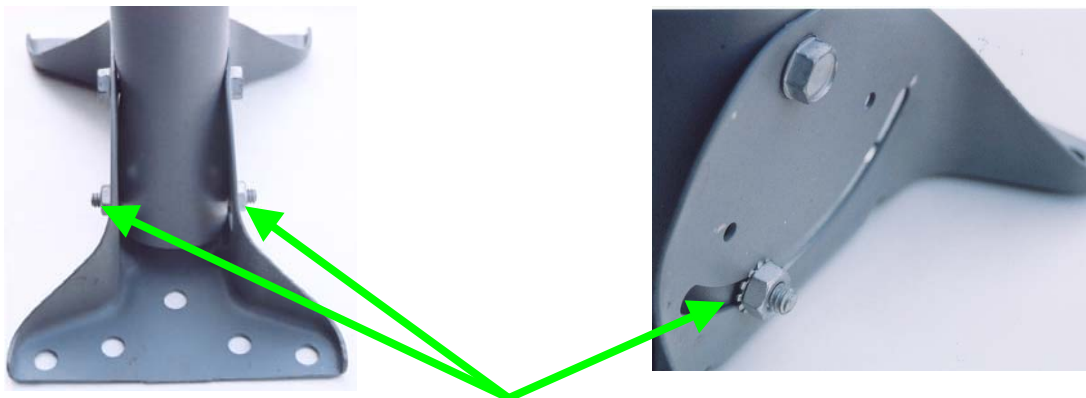
# Dish Assembly and Mounting

Revised 24-07-03

## 5.2.2 UNIVERSAL MOUNT ASSEMBLY

When the “universal mount assembly” is used to mount the dish, it must be “made ready” prior to installing. If a mast mount is being used to install the dish, then the mast must be installed prior to installing the dish. Refer to Section 5.3 for mounting guidelines.

- Insert the two ¼" X ½" carriage head bolts through the mast and curved slot of the mount.
- Capture the 2 bolts with 2 tooth washers and 2 whiz nuts.
- Tighten the bolts just enough to stabilize the pipe mount to the mount foot. It will be adjusted and made plumb once the mount has been secured to the mounting surface.



(2) ¼" X ½" carriage head bolts inserted through the mast (from inside) and through the curved slot.

## CONGRAULATIONS YOU ARE NOW READY TO INSTALL THE MOUNT!!

**THE DISH AND UNIVERSAL MOUNT ASSEMBLY ARE NOW READY TO BE INSTALLED. THE UNIVERSAL MOUNT OR ALTERNATE MAST MOUNT MUST BE INSTALLED PRIOR TO INSTALLING THE DISH ONTO THE MOUNT.**

**THE FOLLOWING SUB-SECTIONS WILL PROVIDE GUIDELINES FOR INSTALLING THE UNIVERSAL OR MAST MOUNT AND IT WILL ALSO INVOLVE WORK OPERATIONS REQUIRING YOU TO FOLLOW SAFETY PROCEDURES.**





# Dish Assembly and Mounting

Revised 24-07-03

## 5.3 INSTALLING DISH MOUNTS

### 5.3.1 GENERAL

By now you should have the following:

- ✓ Completed your site survey.
- ✓ Received owner's permission to install the system.
- ✓ Received written permission to install the system for rental properties.
- ✓ Received customer agreement on all aspects of the installation including dish location and routing of all coaxial and grounding cables/wires.
- ✓ A clear understanding of all installation restrictions.

**AND**

➤ **KNOWLEDGE,**  
➤ **A CLEAR UNDERSTANDING &**  
➤ **COMMITMENT**  
**TO**  
**FOLLOW ALL SAFETY PROCEDURES**



**REMEMBER!!**

**SAFETY IS YOUR  
RESPONSIBILITY**

### 5.3.2 MOUNT LOCATION

The most effective location to mount the dish was determined from your site survey as described in the Section 4.0, customer acceptance and the stability and condition of the mounting surface.



**Customer acceptance of the dish mounting location is your first priority. Customer acceptance must be obtained from the owner(s) and not tenants, resident children, baby sitters, etc.**

Consider the following tips when finalizing your antenna mounting location:

#### **TIPS:**

- Try to avoid roof installations if possible. Avoiding roof installations can reduce possible future water damage that Star Choice may be liable for. If a roof mount is required refer to Section **5.3.4.2 ROOF MOUNTS**.
- Wall, chimney, and mast mounts accessible by ladder are generally easier to install and service.
- Treat the installation as if you were installing it on your own home.
- Try to keep the antenna away from the front view of the home and **at least 3m (10') from aerial Hydro service.**

# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.3 BASE MATERIAL AND FASTENERS

### 5.3.3.1 GENERAL

The materials used in building construction vary widely. Although fastening can occur in many materials, the **base materials and installation procedure are often the weak link when assembling and securing mounts**. The base material is a critical factor in the selection of an anchor or fastener because it must be able to sustain the applied loads. Base material strength can vary widely and is a key factor in the selection and performance of an anchor or fastener.

Critical items to consider in the selection of an anchor to properly fasten the dish mount securely are:

- Base material in which the fastener will be installed such as wood, concrete, concrete block, brick, stucco, siding etc.
- Loads applied by the dish mount including weight and wind loading.
- Quality of fastener material.
- Installation procedures including the method of drilling and the tools used.
- Effect of corrosion as time goes on depends on fastener quality and type.
- Dimensions of the base material including the base material thickness, fastener spacing and edge distance.

The following conversion factors are supplied as a quick reference:

#### **Metric to Imperial Units:**

- From Millimeter (mm) to Inch (in) multiply by 0.0394
- From Meter (m) to Foot (ft) multiply by 3.2808
- From Meter (m) to Yard (yd) multiply by 1.0936

#### **Imperial to Metric Units:**

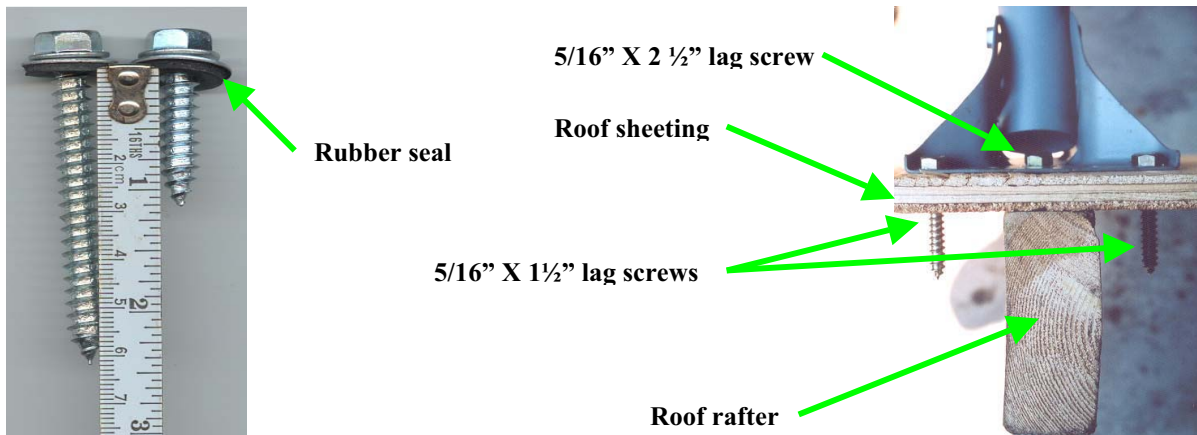
- From Inch (in) to Millimeter (mm) multiply by 25.4
- From Foot (ft) to Meter (m) multiply by 0.3048
- From Yard (yd) to Meter (m) multiply by 0.9144

# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.3.2 WOOD FASTENERS

The dish mount **MUST** be secured to the structure framework such as wall studs or roof rafters. The recommended fastener for mounts to wooden structures are the 5/16" X 2½" and 5/16" X 1½" lag screws that are equipped with a washer and seal.



The photo on the right shows a universal mount that has been **center aligned** with the roof rafter resulting in the (2) 5/16" X 2½" lag screws anchored into the roof rafter and the (2) 5/16" X 1½" lag screws anchored to the roof sheeting.

### **REMEMBER**

Roof sheeting **WILL NOT** (by itself) sufficiently secure a mount to withstand wind loading - it is approx. 3/8" to 1/2" plywood or wafer board that is soft wood. The center of the mount **MUST** be secured to a roof rafter or wall stud.

**IS YOUR VEHICLE LEFT UNATTENDED???**

**SECURE YOUR VEHICLE AT ALL TIMES**



**Look at all the tools and  
satellite systems left  
unattended!!!**

# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.3.3 CONCRETE/BRICK FASTENERS

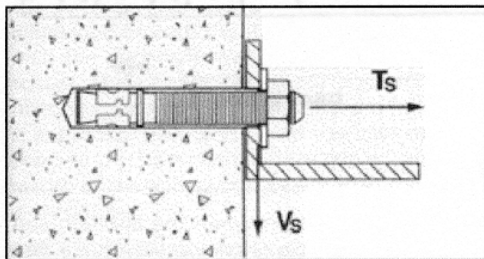
For mounting surfaces constructed with a mix of base materials such as concrete, concrete block or brick, the recommended fasteners for these applications are the wedge type anchor bolts. Some installations, such as hollow block may require toggle bolts, “hollow set” drop-in anchors or threaded rod through the wall due to the hollow cell in concrete blocks, brick facing on concrete block or weakened or cracked base materials.

The next few pages will provide information on the construction, recommended fasteners and installation guidelines.

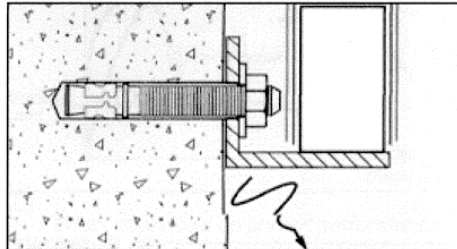
**The information below is for background only to assist in understanding the critical importance of using the proper fastener and following the recommended installation procedures.**

### Applied Loads

There are several factors to be considered when selecting the fastener to suit the base material that will be supporting the antenna mount.



**Combined Load**



**Dynamic Load**

The combined load is a combination of the tension load shown as ( $T_s$ ) and the shear load shown as ( $V_s$ ).

The **combined load** is the force applied to the fastener by the weight of the antenna and its mount.

The **dynamic load** is the force placed on the fastener, by vibration caused from the varying wind forces and air currents.

**AS SHOWN IN THE ABOVE ILLUSTRATION, THERE ARE SEVERAL FACTORS THAT CAN CAUSE AN IMPROPERLY INSTALLED DISH MOUNT TO FAIL AND CAUSE A LOSS OF SERVICE.**

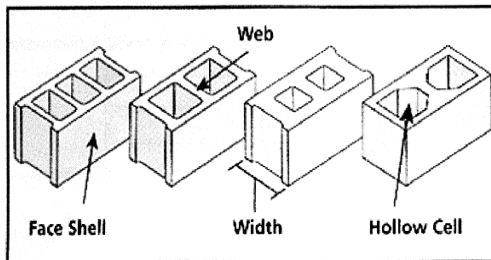
# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.3.3 CONCRETE/BRICK FASTENERS cont'd

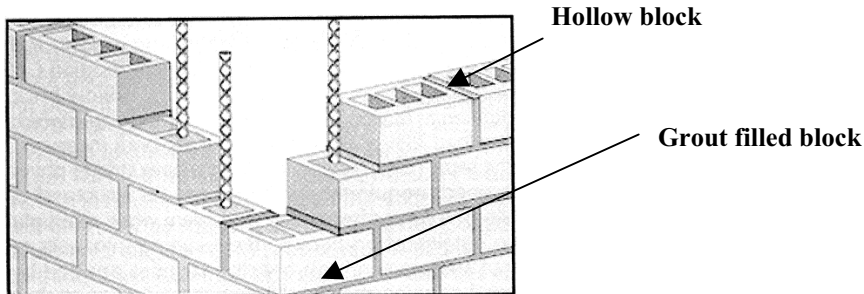
### Concrete Block

The diagram below shows the basic concrete block referred to in the building industry as the C 90 block.



### Typical C 90 Block Measurements (inches)

Width	Face Shell Thickness	Web Thickness
6"	1"	1"
8"	1"	1"
10"	1 3/8"	1 1/8"



### Fastener Guidelines:

- Base material thickness is required to be 125% of fastener length.
- Base material thickness for a 1" fastener is  $1" \times 125\% = 1\frac{1}{4}"$
- Base material thickness for a 1½" fastener is  $1\frac{1}{2}" \times 125\% = 2"$
- Base material thickness for a 2½" fastener is  $2\frac{1}{2}" \times 125\% = 3"$
- The "face shell" thickness of a hollow block may be decreased by as much as ½" during drilling operation due to breakage on the back side of the face shell.

**For reasons above, unless the block is grout filled, wedge type fasteners are not always recommended to secure dish mounts.**

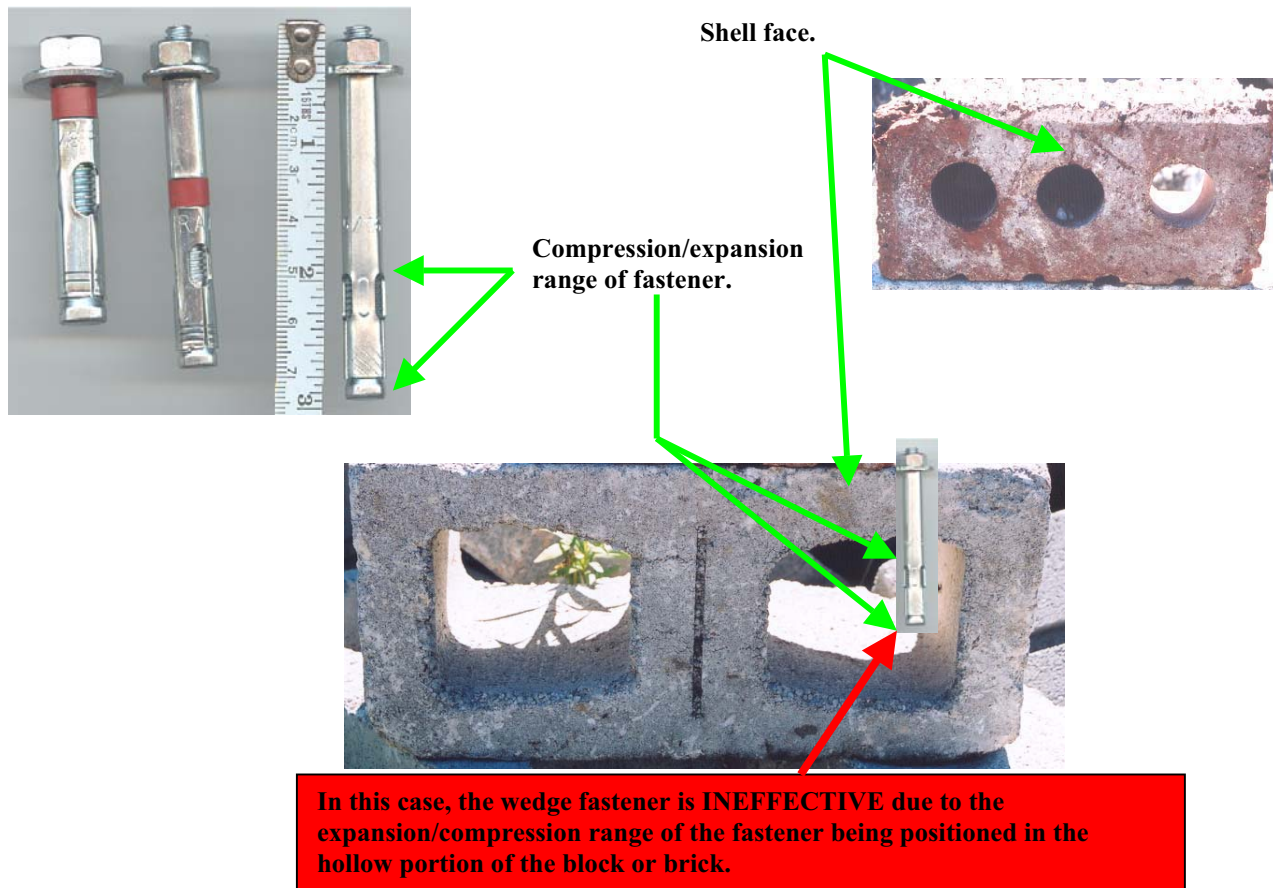


# Dish Assembly and Mounting

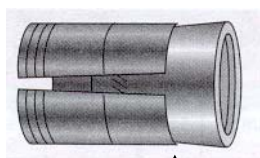
Revised 24-07-03

## 5.3.3.3 CONCRETE/BRICK FASTENERS cont'd

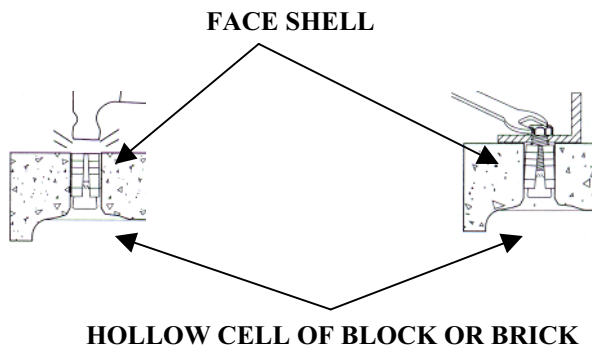
### Wedge Fasteners



**SHOULD YOU ENCOUNTER A HOLLOW CELL IN THE BLOCK OR BRICK WHILE DRILLING THEN CONSIDER USING A DROP-IN ANCHOR AS SHOWN BELOW.**



**DESIGNED TO FUNCTION IN A 1" THICKNESS OF MOST HOLLOW STYLE BLOCKS OR BRICKS.**





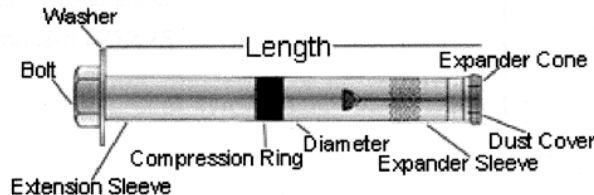
# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.3.3 CONCRETE/BRICK FASTENERS cont'd

### Wedge Fasteners

Mounts attached to solid concrete walls or grout filled block will be secured using 5/16" X 2½" wedge type bolts as shown below:



### **Drilling:**

A properly drilled hole is a critical factor both for ease of installation and optimum anchor performance. When drilling an anchor hole using a carbide tipped bit, the rotary hammer or hammer drill used transfers impact energy to the bit that forms the hole primarily due to the chiseling action. This action forms an anchor hole that has roughened walls. **DO NOT use diamond tipped bits as they create very smooth walls that may cause the anchor to slip and fail prematurely.**

When using mechanical anchors, the condition of the carbide tips used must be monitored, as an excessively worn drill bit will alter the required anchor hole diameter.

The recommended anchor hole depth is at least ½" or one anchor diameter deeper than the anchor embedment depth. The required depth for the 5/16" X 2½" wedge bolt is a minimum of 3" to 3½" deep. When using wedge type anchors the expansion mechanism scrapes the walls of the hole during insertion that pushes concrete dust particles ahead of the anchor. The additional depth will provide place for the dust to settle and not impede the anchor to be fully inserted.

The recommended carbide drill bit for the 5/16" X 2½" anchor is a 5/16" bit of sufficient length to drill a 3" hole. DO NOT use an oversize drill bit as the recommended drill bits are designed to accommodate the required anchor hole diameter.

The anchor should be installed perpendicular to the surface of the concrete wall to ensure optimum performance of the mechanical anchor. The industry standard is +/-6° from perpendicular to ensure an excessive bending load is not applied to the anchor.

**A PROPERLY PREPARED ANCHOR HOLE WILL ENSURE OPTIMUM PERFORMANCE OF THE MECHANICAL ANCHOR AND PREVENT PREMATURE FAILURE.**

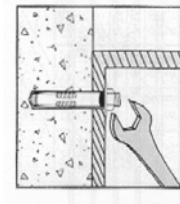
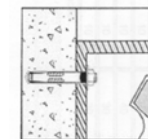
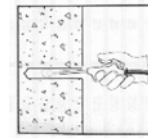
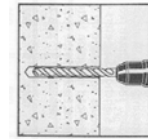
# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.3.3 CONCRETE/BRICK FASTENERS cont'd

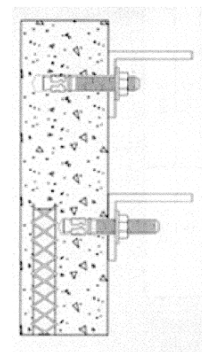
### Installation Procedure:

- Using the recommended 5/16" carbide drill bit, drill a hole to a minimum depth of 3" for the 5/16" X 2½" mechanical anchor.
- Clean the hole from dust and other material.
- Drive the anchor through the mount into the anchor hole until the bolt is firmly seated against the mount body. Ensure the anchor is driven to the required embedment depth.
- Installation torque will be dependent on the brand of wedge type anchor bolt used. **Check with the manufacturers torque recommendations.**
- The majority of mechanical one-piece wedge style anchors specify 3 to 4 turns to the head of the bolt from the finger tight position. This is usually sufficient to initially expand the anchors and is a standard industry practice.
- Typically, the torque for 5/16" anchors is 15 ft/lbs.



### CAUTION:

On occasion, you may encounter concrete walls that have re-enforced steel rods (rebar) installed during the pouring process for additional strength. When this is encountered a slightly shorter anchor can be used providing this situation is limited to one anchor.



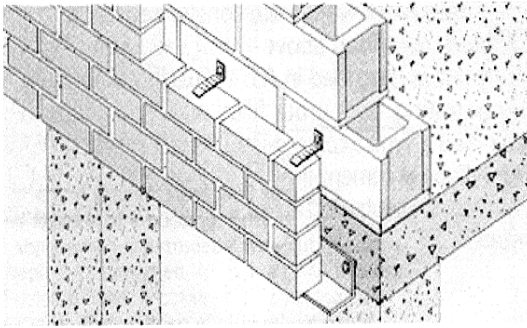
**PROTECT YOUR EYES FROM FOREIGN MATERIAL  
AND CONCRETE/BRICK DUST DURING DRILLING.  
WEAR YOUR SAFETY EYEGLASSES!!!**

# Dish Assembly and Mounting

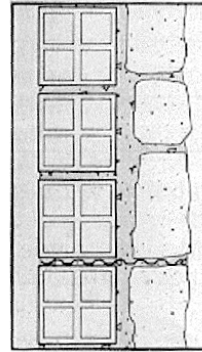
Revised 24-07-03

## 5.3.3.3 CONCRETE/BRICK FASTENERS cont'd

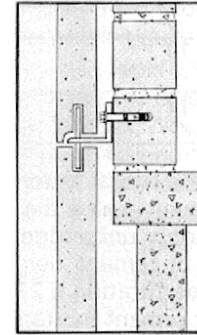
### Brick Walls



**Brick Facing on Hollow Block**



**Stone or Granite Facing**



The unfortunate situation with brick and stone facings is the fact that there are several methods to install the brick and stone facings. As shown above, the installation may be against hollow block or tied in with anchors.

### **Brick Facing**

The problem is compounded with clay brick, as **many varieties of clay brick have cores (hollow shells similar to concrete block)** which makes them very susceptible to the problem of installing anchors as the thin walls cannot sustain the bearing stresses applied by mechanical anchors. They are typically installed on hollow block creating the same issue covered previously under concrete block.

### **Stone or Granite Facing**

In most cases, stone or granite facings will be installed for appearance only. They are not considered to be load-bearing walls; therefore they will be fairly thin in thickness and tied to an interior load-bearing wall with anchors.

**A PROPERLY INSTALLED ANCHOR WILL ENSURE OPTIMUM PERFORMANCE AND PREVENT PREMATURE FAILURE.**

**WHEN AN ANCHOR HAS FAILED, IT IS USUALLY DUE TO IMPROPER INSTALLATION, IMPROPER ANCHOR OR BASE MATERIAL FAILURE.**

**THE NEXT PAGE PROVIDES SAMPLES OF COMMON FAILURES.**

# Dish Assembly and Mounting

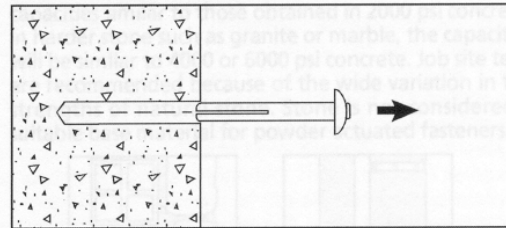
Revised 24-07-03

## 5.3.3.3 CONCRETE/BRICK FASTENERS cont'd

### Modes of Failure

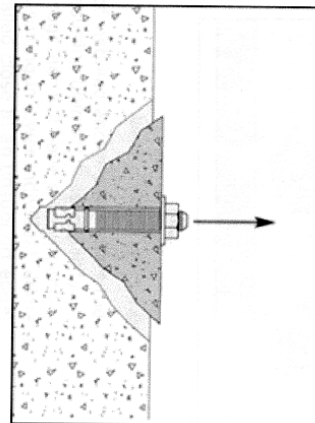
**Anchor pullout** occurs when the mount, dish and wind loading applies a load on the anchor that is greater than the friction or compressive force developed between the anchor body and base material. This is usually contributed to by:

- Improper installation.
- Hole too large.
- Worn out carbide drill bit.
- Wrong drill bit (i.e. diamond tipped, wrong size).



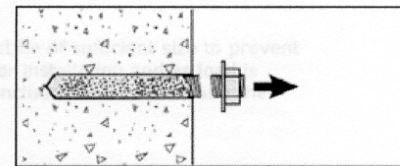
**Base material failure** occurs when the mount, dish and wind loading applies a load greater than the strength of the base material. Typically in concrete, a shear cone will be pulled out. This is usually contributed to by:

- Installation - too shallow of hole.
- Installation – over torque on anchor.
- Anchor too short.
- Weak base material (low strength of concrete or brick)
- Deteriorated concrete or brick.



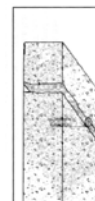
**Anchor failure** occurs when the mount, dish and wind loading applies a load greater than the strength of the anchor material. This is usually contributed to by:

- Poor quality anchor.
- Over torque on anchor.



**Base material splitting** occurs when the anchor was installed too close to the edge of the base material. This usually contributed to by:

- Too close to edge of base material (especially brick).
- Hole too small and hammering in anchor.



# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4 MOUNT TYPES

The following subsections provide guidelines and illustrations for installing various types of mounts required to support the satellite dish and LNB assembly.

- Wall/chimney mounts
- Roof mounts
- Balcony mounts
- Fence/mast mounts
- Non-penetrating mounts

### 5.3.4.1 WALL/CHIMNEY MOUNTS

#### Brick/concrete block

The majority of wall/chimney mounts will utilize the universal mount assembly that is included with the dish assembly. **Wall/chimney mounts should be your first choice**, as in most cases it will provide a very stable mounting surface and is easily accessible for service. As well, wall mounts eliminate the concern of water leaks when installing roof mounts. All mounts **MUST** be securely fastened to a structure surface that is stable and in good condition.

**Before mounting on brick or concrete, ensure you are familiar with and follow the guidelines in section 5.3.3.3, covering concrete/brick fasteners.**

Where possible the mount fasteners should be installed into the brick/concrete block mortar providing the mortar is in good shape.

This allows:

- Ease of repair when removing mounts. Mortar is easier to repair than brick.
- Eliminates the possibility of damaging/cracking bricks.



Cable clips should be installed into brick mortar.



Last layer of brick

Top of mount **MUST** be at least 15 cm (6") or 2 layers of brick below last layer of bricks to minimize cracking of brick when installing fastener.

**NOTE: DO NOT** install a mount within 15 cm (6") of a corner to prevent the cracking of bricks.

**Mount must be installed at least 15 cm (6") or 2 bricks from top layer of bricks and at least 15 cm (6") from corners to eliminate the possibility of cracking bricks.**

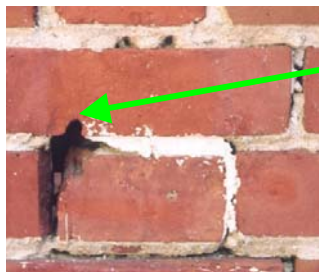


# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4.1 WALL/CHIMNEY MOUNTS cont'd

### Brick/concrete block



Mortar has deteriorated to a point where the mount **MUST** be installed into the brick.

Wedge anchor did not hold.



Illustrations of properly installed mounts to brick.



**REMEMBER**  
**WHEN USING DRILLS WEAR SAFETY GLASSES!!**



**EYESIGHT**

Type of fastener used depends on type of brick.



Hollow cell brick



Indented center brick



Solid brick



Monitor depth of drilled hole to determine type of fastener



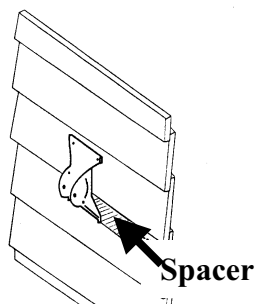


# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4.1 WALL/CHIMNEY MOUNTS cont'd

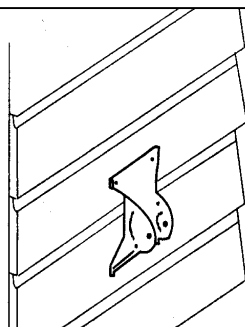
### Wood/vinyl siding:



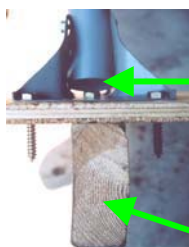
Wood lap Siding

- When mounting on a wooden structure, you need to locate a supporting stud for the installation, as this will add to the strength and stability of the installation.
- When installing on beveled siding, if the width of the siding is less than the length of the foot, it will be necessary to install a spacer as shown to bring the “mounting foot” to a vertical position so as not to damage the siding slats.

Flat Wood Surface



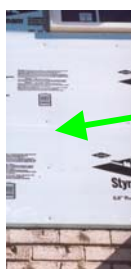
- Care must be taken when measuring to find a stud so as to not damage the surface needlessly.



Wall stud

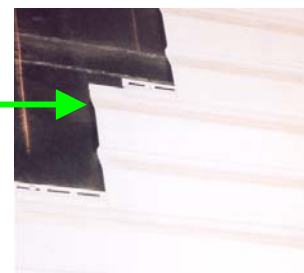
- The 2 mounting holes on the center-line of the mounting foot are specifically for the purpose of fastening to a stud.

Vinyl/aluminum siding



25 mm (1")  
Styrofoam is typically  
under the siding.

Vinyl/aluminum siding  
has no support under  
the beveled edges



**Securing mounts to vinyl/aluminum siding cannot be properly secured, as the Styrofoam will crush resulting in collapsed siding.**

**DO NOT INSTALL MOUNTS TO VINYL/ALUMINUM SIDING**



# ***Dish Assembly and Mounting***

Revised 24-07-03

## **5.3.4.2 ROOF MOUNTS**

Should a wall/chimney mount not be suitable then install the dish mount on the roof. Prior to installing a mount on the roof ENSURE the following waterproofing guidelines are clearly understood and adhered to:

### **WATERPROOFING GUIDELINES**

When securing any type of a mount on the roof, care must be taken to keep the roof penetration to a minimum. In all cases, a layer of approved roofing patch or rubber sealant must be applied to the underside of the mount prior to fastening into the roof structure. Sufficient sealant will be used to ensure water will not penetrate the roofing membrane. Slate, steel, clay, shake shingle and flat roof homes or commercial establishments must NOT have the roof membrane compromised in any way; a non-penetrating roof mount or wall must be used in these installations.

The dish mount is the only location a roof membrane should be compromised, NO other holes, screws, staples or nails should penetrate the roof membrane. Approved “shingle clips” may be required to aid in routing the coaxial cable to the eve. Locating the mount as close to the roof edge as possible, without compromising signal quality, will aid in reducing the coaxial cable run and possibly reduce water damage if the mount can be located on the overhang portion of the roof.

Under NO circumstances should the dish mount be located in a valley of the roof as snow and ice buildup at these locations may cause the roof membrane to fail. Care must be taken not to walk or step in the valley portions of the roof as the membrane is fragile at these locations and is usually constructed of sheet metal or tarpaper tucked under the shingles.

Shingles or flashings should not be lifted to install mounts as this will break the seal and allow wind to break the shingle or allow water to blow under the shingle or flashing and damage the roof substructure.

It is important to obtain the homeowners permission prior to installing any type of mount to the roof and equally important to report any roofing problems that you have observed while working on the roof. The roofing problems could consist of missing, broken, or loose shingles, broken or loose valleys and flashings etc. It is a good policy to note any abnormal roofing conditions on the work order as to the condition of the roof when you arrived, as this may eliminate the possibility of the homeowner coming back on Star Choice for damage to the roof. Once the mount has been secured to the roof use roof sealer around the edges of the roof mount and over the heads of each lag screw.

# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4.2 ROOF MOUNTS cont'd.

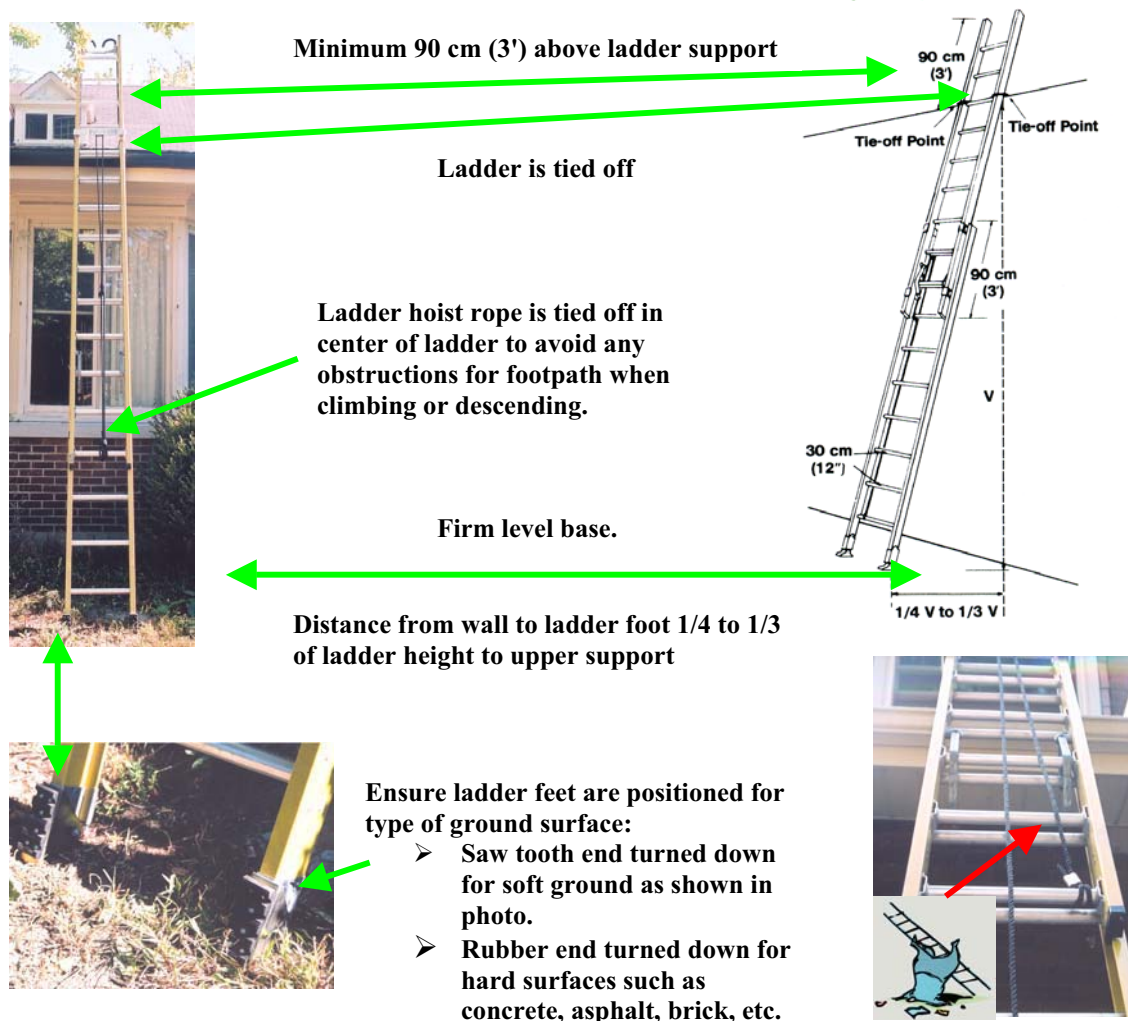
### SAFETY

Working on roofs or roof edges will involve the use of extension ladders to gain access to the roof or provide you with a device to work from.



**ENSURE YOU HAVE READ AND FOLLOW THE LADDER SAFETY GUIDELINES IN SECTION 1.2.6 PRIOR TO USING ANY LADDERS.**

### QUICK REVIEW:



# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4.2 ROOF MOUNTS cont'd.

### ROOF CONSTRUCTION

Based on the information provided in Section 2.0 “Basic Satellite Fundamentals” there should be very few occasions when the dish mount cannot be installed on the lower portion of the roof allowing you to work from your ladder.

As previously mentioned in Section 5.3.3.2 “Wood Fasteners”, the universal roof mount **MUST** be secured to a roof rafter. The following is a quick review on roof construction to provide you with some in-sight on where to find a roof rafter:



Rafter spacing may be 40 cm (16") or 60 cm (24") centers.

**NOTE:** Overhang rafters run opposite to main rafters therefore, mounts cannot be mounted on overhang portion.



Center screw pattern will not align with rafters on overhangs.



**Recommended mount locations.**

- End rafter
- Any rafter across roof span

# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4.2 ROOF MOUNTS cont'd.

### INSTALLATION

#### Step 1: Locate the rafter.



#### METHOD 1

Using a hammer lightly tap while listening for a duller sound to locate the rafter

#### METHOD 2

Using a putty knife carefully lift a shingle and drill holes across to locate the rafter.



If using METHOD 2 care MUST be taken not to crack or break the shingle as they become very brittle over the years. Also, if this method is used you MUST reseal the shingle with roofing repair sealer to ensure the shingle lays flat on the roof and is resealed to the lower shingle. (See above right photo and note the shingle seal line.)

#### Step 2: Prepare the mount.

##### Method 1:



3 strips of flexible roof sealer



Apply flexible seal strips to bottom of mount.



Puncture seal with screwdriver to prevent the seal from wrapping around drill bit. (See note 1)

**Note 1:** If you do not puncture the seal, the flexible sealer will wrap around the drill bit when drilling – similar to drilling through carpet where the carpet fibre material wraps itself around the drill bit causing it to unravel.



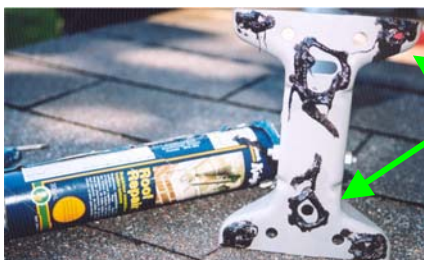
# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4.2 ROOF MOUNTS cont'd.

### Step 2: Prepare the mount.

#### Method 2:



Using an approved roof sealer, apply the sealer around each of the 6 mount screw holes.

### Step 3: Prepare the roof.



- Pre-drill the roof (6 holes) using the mount as your pattern.
- Fill each hole with sealer



Note: The sealer that was inserted into the pilot hole is pushed through with the lag screw and assists in weatherproofing the hole.

### Step 4: Install the mount.



With the mount prepared for installation and sealer applied secure the mount to the roof with the 6 approved lag screws.

Approved lag screws equipped with washers and rubber seals.



# Dish Assembly and Mounting

Revised 24-07-03

(2) 5/16" X 2½" lag screws to be anchored into the roof rafter and the (2) 5/16" X 1½" lag screws anchored to the roof sheeting.

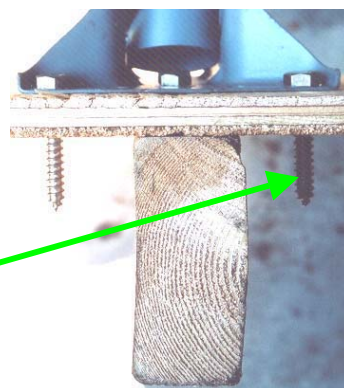
## 5.3.4.2 ROOF MOUNTS cont'd.

### Step 4: Install the mount cont'd.



**Note:** The mount is centered over the roof rafter or wall stud and secured with the 6 lag screws.

**Note:** The sealer that was inserted into THIS ONE pilot hole is pushed through with the lag screw and assists in weatherproofing the hole.



### Step 5: Seal the mount.

Although sealer was applied to the bottom of the mount it is recommended to add additional sealer around the lag screw heads and the top ends of the mount.



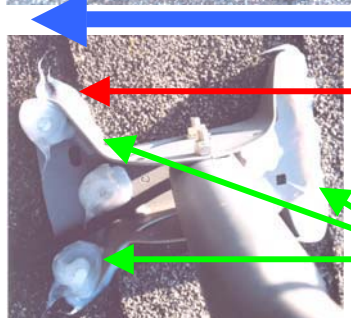
Unlike the other mount holes one center hole is oval in shape resulting in the lag screw rubber seals NOT making a proper seal.



Extra precaution taken to seal the complete mount is less expensive than repairing water damage.



Sealer applied to the top ends of the mount and the one oval screw hole



Direction of roof slope

Mount foot does NOT lie flat due to shingle edge

**RECOMMENDED**

Apply sealer to ALL lag screw heads and All upper edges of mount.

# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4.3 RENTAL PROPERTY MOUNTS

The DTH satellite industry in Canada is only a few years old and the building industry is just starting to catch up when planning for TV entertainment by pre-wiring for services other than CATV.

Most apartment and multi-dwelling units are not pre-wired or equipped to handle DTH satellite services, however the DTH satellite consumer demand is increasing daily. Property Management companies, Landlords, etc are having to make special agreements with tenants to accommodate their requests for DTH satellite services. Along with permission to install DTH satellite services comes special installation instructions and restrictions that **MUST** be adhered to by ALL Star Choice satellite installers.



**PRIOR TO INSTALLING A STAR CHOICE SYSTEM INTO ANY RENTAL PROPERTY OR CONDO OWNED MULTI-LEVEL DWELLING PERMISSION MUST BE GRANTED AND VERIFIED WITH THE PROPERTY OWNER OR PROPERTY MANAGEMENT COMPANY**

**STAR CHOICE SYSTEMS INSTALLED WITHOUT PROPER PERMISSION FROM AUTHORIZED PERSONNEL WILL LEAD TO FORCED REMOVAL AND ALL SUBSEQUENT REPAIRS TO THE BUILDING STRUCTURE AT THE EXPENSE OF STAR CHOICE COMMUNICATIONS INC.**

**NOT FOLLOWING RULES AND POOR JUDGEMENT PROVED TO BE COSTLY TO STAR CHOICE FOR ROOF REPAIRS**



**DISH WAS RE-LOCATED FROM THE ROOF TO THE FENCE**

**Restriction: DO NOT attach to building structure.**

- Restriction NOT adhered to.
- Proper site survey not done as system worked satisfactory from new location.
- Unnecessary expense to Star Choice for installation due to extra time required for a roof installation.
- Additional expense to Star Choice to re-locate dish and repair roof.

# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4.4 BALCONY MOUNTS

Balcony mounted dishes will be a challenge due to the restrictions that must be adhered to. Property Managers must administer the guidelines set forth by the building owners who are concerned with:

- Aesthetics.
- Damage to balcony railings.
- Holes drilled into the brickwork to mount the dish.
- Holes drilled through the bricks for cable access.

### **GUIDELINES:**

- OBTAIN permission from the Property Manager.
- Strictly adhere to the installation restrictions.
- DO NOT deface balcony railing in any way.
- DO NOT obstruct adjacent unit's view.
- Ensure the complete dish/mount is fully within your customer's balcony.
- Attempt to drill cable entry holes through existing fixtures such as door and window edges, air conditioner edges, etc.
- Secure all coaxial cables – DO NOT lay on balcony.
- Drill holes (if permission granted) into mortar, as much as possible.
- When using tripods, ensure it has sufficient ballast to protect the dish from being moved by the wind or accidentally being knocked into by children, etc.
- Be careful of overhead balconies blocking or restricting line-of-sight due to angle of signal entry.
- Maximum unsupported height of masts is 90 cm (3').



**ACCEPTABLE INSTALLATION**

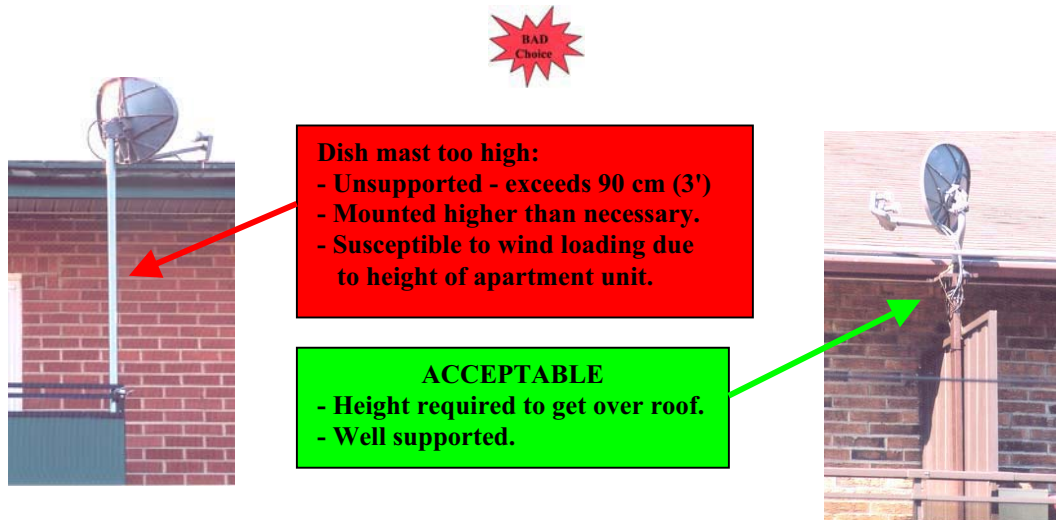
- Dish securely bolted to balcony railing.
- Coaxial cable secured to railing.
- Dish not obstructing anyone's view.
- Coaxial cable secured to brick mortar.
- Coaxial entry point through air conditioner opening.



# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4.4 BALCONY MOUNTS cont'd



## 5.3.4.5 FENCE/MAST MOUNTS

### GENERAL

Property Management companies, Landlords, etc are having to make special agreements with tenants to accommodate their requests for DTH satellite services. Along with permission to install DTH satellite services comes special installation instructions and restrictions that MUST be adhered to by ALL Star Choice satellite installers.

Many low rental complexes, Municipal housing projects, etc are now trying to accommodate the tenants however, due to the nature of these complexes they have great concern over the aesthetics due to the number of separate dishes that are required to service each customer. Below, is a sample complex where the installations are controlled and conform to a specific standard dictated by the Property management Company.



### RESTRICTIONS:

- Cannot attach dishes to main structure.
- All dishes must be mounted in a similar fashion and at the same height.
- Cannot attach dishes directly to fence.
- All masts must be the same type and size – do not mix between wood posts and metal pipes.



# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4.5 FENCE/MAST MOUNTS cont'd



### SAFETY REMINDER

- Always inspect the ladder before using it for:
  - ✓ Cracks, splits
  - ✓ Twisted or jammed parts
  - ✓ Loose screws, rivets or rungs.
- Open the ladder as far as it goes.
- Lock the spreader arms in place.
- Push the bracket shelf down into place.
- Ensure the ladder is placed on an even space and within easy reach of your work.
- If setting your ladder up in front of a closed door, open the door or lock it.
- Always climb and descend facing the ladder.
- Climb the ladder one rung at a time.
- Set your tools on the bracket shelf of the ladder – do not climb with them in your hands.



Property Managers must administer the guidelines set forth by the building owners who are concerned with:

- Aesthetics.
- Damage to the main structure.

### GUIDELINES:

- OBTAIN permission from the Property Manager and strictly adhere to the installation restrictions.
- Ensure the complete dish/mount is fully within your customer's patio area and DO NOT obstruct adjacent unit's view.
- Reuse existing CATV cable entry points (if available).
- Attempt to drill cable entry holes through existing fixtures such as door and window edges, air conditioner edges, etc.
- Secure all coaxial cables – DO NOT lay on or inside patios or fences.
- Drill holes (if permission granted) into mortar, as much as possible.
- When using tripods, ensure it has sufficient ballast to protect the dish from being moved by the wind or accidentally being knocked into by children, etc.
- Maximum unsupported height of masts is 90 cm (3').
- Ensure masts are secured with an anti-twist device.
- DO NOT install masts at the end of an unsupported fence run.



# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4.5 FENCE/MAST MOUNTS cont'd



- ACCEPTABLE**
- Unsupported mast below 90 cm (3').
  - Mast supported in 2 locations.
  - Anti-twist screw installed.
  - Within 60 cm (2') of fence "wall support".
  - Mast is made plumb prior to being secured.



**TIP**

**DO NOT** lean ladder against fence when checking plumb.



- UNACCEPTABLE**
- **DO NOT** attach mast directly to fence.
  - **DO NOT** install masts to fences that are not secured within 60 cm (2') of the main structure.
  - Mast can be attached to fence if it is a corner post for 2 fence lines.



Unsupported mast too high

Mast clamps too large for mast and NO anti-twist screw.

Supported portion of mast too short



# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4.6 NON-PENETRATING ( Flat Roof ) MOUNTS

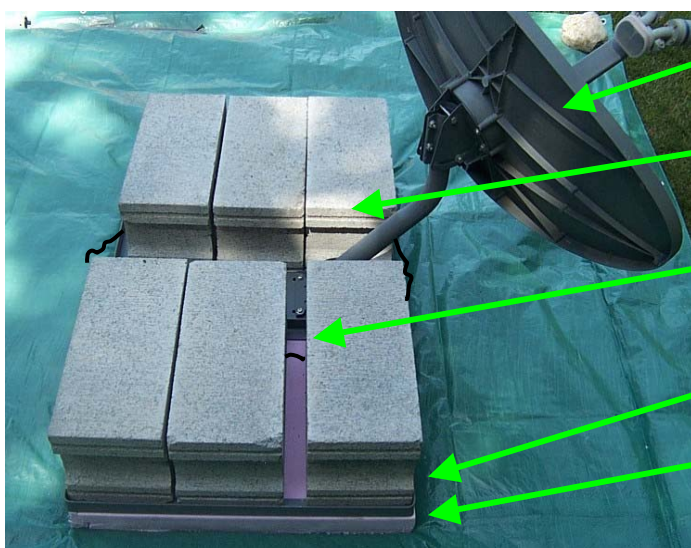
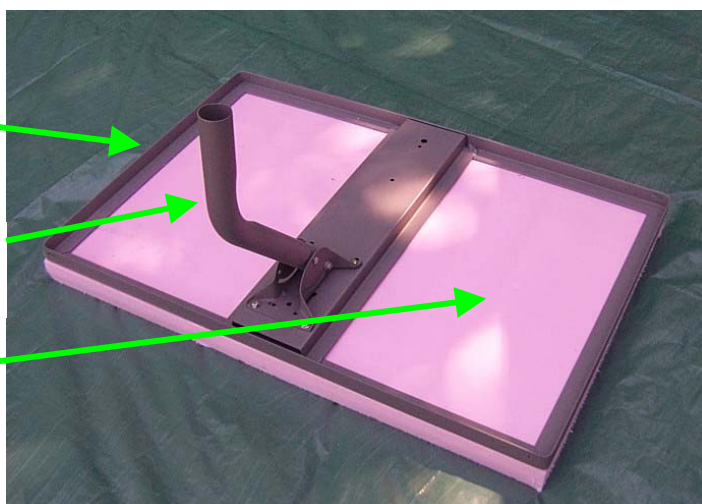
There are occasions when you may be required to install a mount on a flat roof that brings forth another set of guidelines. Flat roof mounts require ballast for stability and as such, cannot be installed on most flat roofs unless sufficient protection is provided. Most flat roofs are comprised of a soft/tar sealed membrane with a layer of “pea gravel” that can puncture the membrane seal if direct pressure is applied to surface.

### Flat roof mount with Ballast and Dish removed

Flat roof mount

Dish mount bolted to Flat roof mount

SM foam same size as mount



Dish installed to side of mount for max snow depth protection.

C90 (8 inch) concrete blocks turned sideways

Wire cable threaded through blocks to secure from vandalism.

Flat roof mount tray

5 cm (2") SM insulation



# Dish Assembly and Mounting

Revised 24-07-03

## 5.3.4.6 NON-PENETRATING ( Flat Roof ) MOUNTS cont”d

### Non-penetrating ( Flat roof ) mount installation procedures:

- Sweep away the “pea gravel” clear of the area for the mount placement, being careful not to disturb the roof membrane. **DO NOT** disturb roofs with a gravel and tar mixture; place 5 cm (2") SM insulation on the roof.
- Install a 5 cm (2") thick SM insulation, with same diameter as the mount, on the bare membrane.
- Construct mount on foam and place excess gravel around outside of mount.
- Install six or eight inch blocks **horizontally**, as shown above, to prevent ice and snow buildup which could cause the blocks to crack during thawing and freezing.
- Thread guy wire through the blocks and secure with a locking “U” bolt for vandalism reasons.
- Install a one-piece mast. - **DO NOT** add extensions.
- The cable entry into the building **MUST** be through a special cable entry point or a **customer approved** entrance point on the roof. All entry points are to be sealed and if entry point is other than a vertical opening, have customer sign off on the work order. Under **NO circumstances** shall the cable be installed through the roof membrane.



# ***Dish Alignment and Signal Tuning***

Revised 22-07-03



## **INSTALLATION HANDBOOK**

### **6.0**

### **DISH ALIGNMENT and SIGNAL TUNING**



# Dish Alignment and Signal Tuning

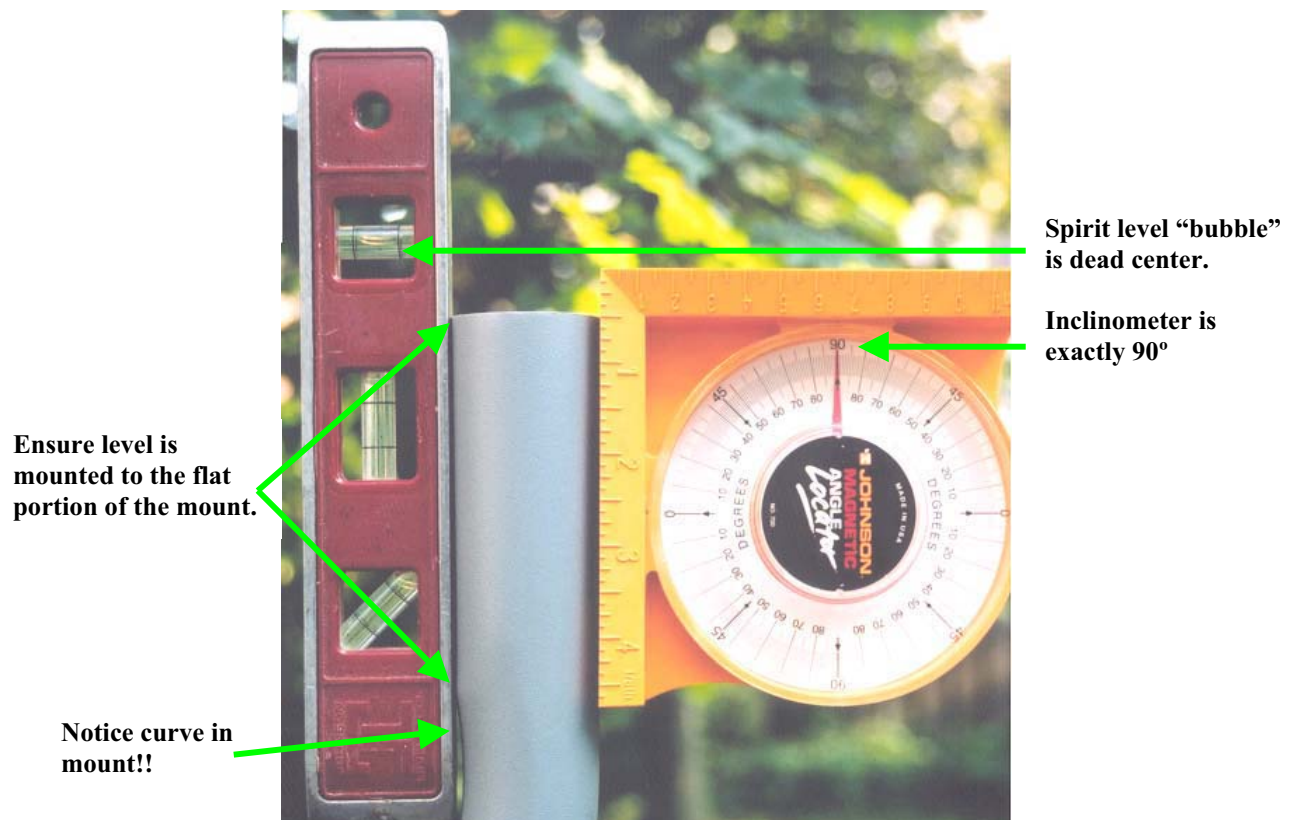
Revised 22-07-03

## 6.1 GENERAL

Prior to tuning the dish to obtain maximum signal strength, the Universal Mount or pipe mast **MUST** be adjusted/installed at exactly 90°.

**THIS IS THE MOST CRUCIAL ADJUSTMENT YOU WILL MAKE, TO ASSIST YOU AND ENSURE THE DISH CAPTURES THE STAR CHOICE SIGNAL WHEN ADJUSTING THE AZIMUTH (COMPASS HEADING).**

**THIS IS THE MOST COMMON CONTRIBUTOR TO INSTALLERS HAVING PROBLEMS LOCATING THE STAR CHOICE SATELLITES.**



Use of either tool shown above is acceptable to adjust the plumb of the mount or mast. It is beneficial to you that either tool used, should have the magnetic strip to allow the use of both hands when adjusting and securing the bolts or lag screws.



# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.1 GENERAL cont'd

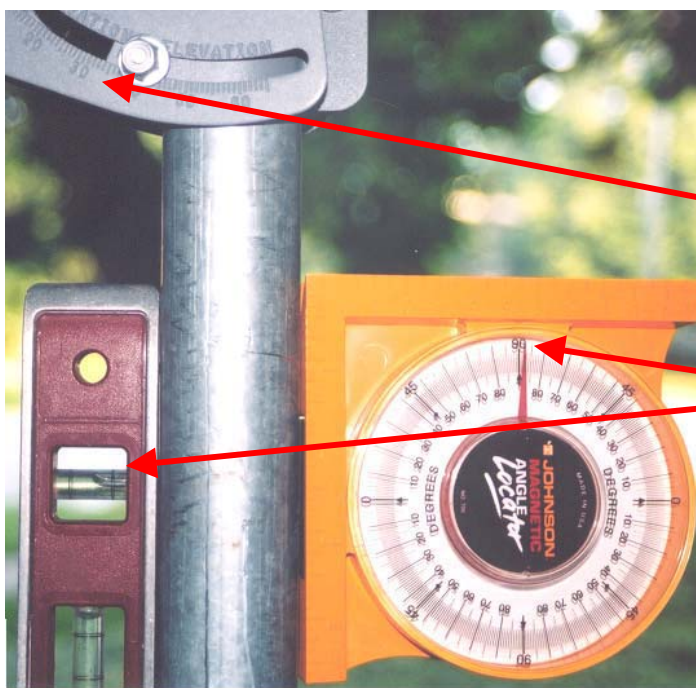
**THIS PAGE IS DEDICATED TO THOSE INSTALLERS WHO CONTINUOUSLY HAVE PROBLEMS FINDING THE STAR CHOICE SATELLITE DUE TO THE FOLLOWING SIMPLE RULE.**



Elevation is pre-set to 32° (SAT “B”) for London, Ontario per the “Dual Satellite Locator Chart” in Section 4.0 Attachment 4.1.

Mount is set and secured plumb:

- 90° on inclinometer
- Or
- Spirit “bubble” centered.



To capture the Star Choice satellites the “elevation setting” had to be set to 34°.

**BECAUSE**

The mount/mast was NOT set plumb

Setting the known proper elevation setting to 32° would cause the dish to point too low that prevents you from capturing the Star Choice signal.

# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.1 GENERAL cont'd

### IMPORTANT MESSAGE

**AS STATED EARLIER, THE MOST COMMON CONTRIBUTOR TO INSTALLERS HAVING PROBLEMS CAPTURING THE STAR CHOICE SIGNALS IS THE MISALIGNED MOUNT OR MAST.**

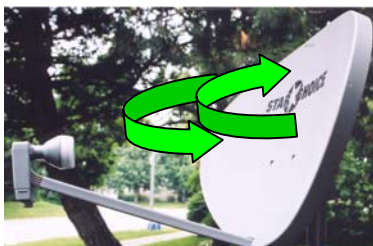
A misaligned mount will contribute to the following:

- Tuning to wrong satellite.
- Time wasted due to:
  - Time spent for trips from the dish location to check the receiver only to find out that you are on the wrong satellite.
  - Requesting assistance from the customer (2<sup>nd</sup> person) to work with you by yelling numbers from the TV screen through a window or door.
  - Expense incurred by using your cell phone, while you are at the dish location, to talk to the customer located at the receiver.
  - Trips back and forth from the dish to the receiver when adjusting for maximum signal.
  - Lost time involved with setting up a temporary TV set at the dish location.

**DUE TO THE IMPORTANCE OF THIS ISSUE, THE FOLLOWING INFORMATION AND ILLUSTRATIONS IS PROVIDED TO ASSIST YOU IN UNDERSTANDING THE IMPORTANCE OF SETTING THE MOUNT OR MAST PLUMB.**

Understanding the “Basic Satellite Fundamentals” in Section 2.0, in particular, Section 2.7 “Basic Dish Design”, will assist you in understanding the following.

### BASIC ALIGNMENT TERMS



**AZIMUTH**



**ELEVATION**



**SKEW**

# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.1 GENERAL cont'd

### TRIVIA

THE WRITER (AT HIS OWN EXPENSE) EMBARKED ON A DAYTRIP – I MEAN SPACE TRIP ONE DAY TO GET THIS PHOTO.

SERIOUSLY

THE PHOTO TO THE RIGHT IS A SIMULATED VIEW OF EARTH AS VIEWED FROM ANIK E2.

View from ANIK E2  
35780 km above 0°1'S 111°1'W



USING YOUR IMAGINATION LOOK AT CANADA FROM WEST TO EAST AND SOUTH TO NORTH AND IT MAY SHED SOME LIGHT ON WHY THE 3 BASIC ALIGNMENT ADJUSTMENTS MENTIONED ON THE PREVIOUS PAGE ARE REQUIRED.

**THE GOAL OF THIS EXERCISE IS TO PROVIDE YOU WITH THE TOOLS AND KNOWLEDGE TO ALIGN THE DISH TO CAPTURE THE STAR CHOICE SIGNALS AND FINE TUNE THE DISH FOR MAXIMUM SIGNAL LEVEL WITHOUT REPEATED TRIPS TO/FROM THE DISH LOCATION.**

NOTE:

Fine tuning the dish to a high signal strength reduces signal interference in adverse weather conditions. Although the maximum possible signal strength is 99, you most likely will not reach this level.

The tools required to align the dish and fine tune for maximum signal are:

- Patience.
- Satellite signal level meter (fully charged).
- (2) 11mm (7/16") wrenches.
- Short RG6 test cord to connect between the LNB and the Level Meter.

# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.1 GENERAL cont'd

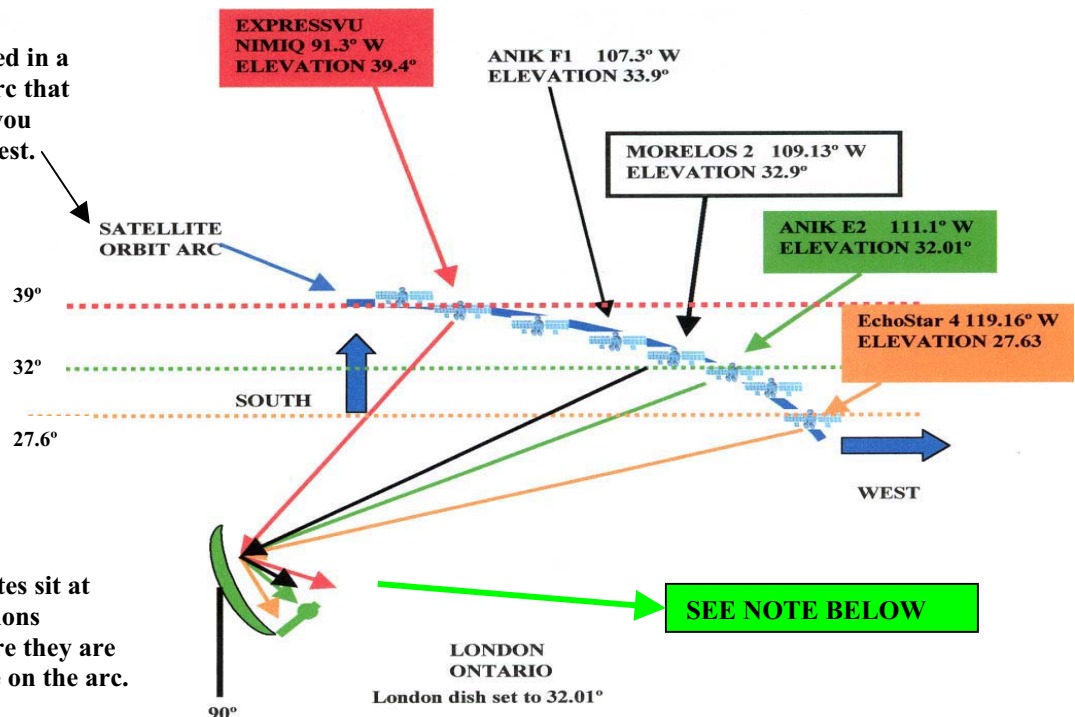
Before we get into the actual dish alignment let's review how the dish captures the satellite signals. Again, be familiar with the information contained in Section 2.7. It is difficult to illustrate on paper, however read the following and should you require more information on reflection angles and signal capture refer to ATTACMENT #6-2. Prior to explaining the illustration we MUST assume the following:

- Dish mount or mast is installed and secured plumb.
- Installation site is London, Ontario.
- For dual satellite operation the Skew, Elevation and Azimuth settings are obtained from the Dual Satellite Locator Chart under "SAT B" located in Attachment 4.1 in Section 4.0.
- **The skew was pre-set to 118 and the elevation was pre-set to 32° for London, Ontario.**

All satellites are located in a fixed position on an arc that drops in elevation as you look from South to West.

From London E2 sits at 32° as shown by the green line.

All other satellites sit at different elevations depending where they are parked in space on the arc.



- Your compass provides you with a general heading (229°). At this point pan (turn) the dish to the South (left when behind the dish) to approx. 200° which will be your start point.(near the satellite shown in red - ExpressVu).
- Note, on the illustration above that the bore sight of the dish points below the arc because the satellite at this point is at 39°, therefore you will NOT see any signal.

**NOTE: REFER TO ATTACHMENT 6-2 FOR AN ADDITIONAL ILLUSTRATION ON REFELCTION ANGLES AND CAPTURE OF THE SIGNAL BY THE LNB.**





# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.1 GENERAL cont'd

- As you pan the dish West the dish will start to capture signals from adjacent satellites (ie Morelos 2).
- While monitoring the level on the satellite meter you will encounter a stronger signal as you pan the dish West (right when behind dish) by E2.
- Continue panning the dish West and you again pick up signals from adjacent satellites West of E2 that will again be lower in signal strength than the signal captured by E2 as the dish now points above the satellite arc.
- At this point, return the dish to the position where the highest signal level was captured. If you have set the mount plumb and set the elevation at 32° (London setting) the strongest signal **will be** ANIK E2.
- At this point, you will now fine tune the signal by performing slight adjustments on the Azimuth and Elevation which we will cover later in this section.

I'm sure, everyone has encountered the capturing of several signals of various signal strengths and some may have been confused as to which signal belongs to ANIK E2.

Let's review what has happened when panning the dish through the satellite arc.

- When the dish was pointing at the ExpressVu satellite (approx. 202° on compass) no signal will be received for two reasons:
  - ExpressVu uses circular polarization Vs linear polarization that Star Choice uses (not compatible with Star Choice LNB).
  - ExpressVu sits at 39° (London setting), and your dish/LNB is set to capture signals from satellites at 32° (London setting) therefore your dish is well below the satellite arc. The ExpressVu signal captured by your dish will be reflected away from the capture point of your LNB (As shown in the illustration on the previous page by the red line on the dish).
- As you pan your dish West you will start picking up signals from other KU Band, linear polarized satellites such as Morelos 2 as shown in the previous illustration.
- The signal from Morelos 2 (as shown by the black line) will be reflected off the dish reflector and will be partially captured by the LNB, however the signal level will be lower than E2 because Morelos sits at 32.9° and your dish is set to capture signals at 32°.
- As you pan slightly West your signal strength will increase as your elevation setting matches the elevation of E2.
- The same situation will occur as you move further West and start picking up weaker signals from adjacent satellites West of E2. (Refer to the orange line)

**IF YOUR MOUNT IS PLUMB, THE DISH ELEVATION IS TRULY 32° (LONDON SETTING) AND MATCHES THE ELEVATION OF E2, THE DISH WILL CAPTURE THE STRONGEST SIGNAL.**

**IF YOUR DISH ELEVATION IS SET FOR 32° (LONDON SETTING) AND YOUR MOUNT IS OFF BY 1° (LEANING BACK) THEN THE TRUE ANGLE OF THE DISH WILL BE 33° WHICH WILL NOW MATCH THE ELEVATION OF MORELOS 2 WHICH WILL PRODUCE THE STRONGEST SIGNAL.**

**RESULT: TUNED TO WRONG SATELLITE.**



# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.1 GENERAL cont'd

At this point you may be asking yourself “What about F1”, as from London, Ontario it sits at 33.9° compared to 32° for E2....Good question!

The design of the dual satellite elliptical dish combined with the dual LNB that are offset from each other allows for the capturing of signals from 2 satellites at different elevations. The same rules previously discussed also apply to F1 however, for maximum signals from both satellites use E2 (SAT B) as the primary satellite when aligning your dish.

Hopefully the preceeding provides some insight on the how and why it is easy to capture the wrong signal when simple guidelines are not followed.

## 6.2 INSTALL DISH TO MOUNT

At this point of your installation, you have completed your site survey, received customer approval for the dish location and have secured the mount to the mounting surface.

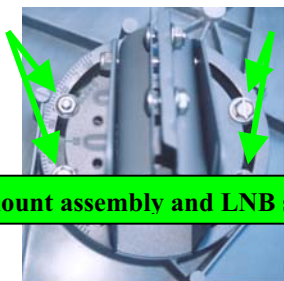
It is time to install the dish onto the mount and align the dish for maximum signal.

**The goal is to install, align the dish and tune for maximum signal without making unnecessary trips to/from your vehicle or in/out of the customer's home to check the receiver for signal level or if on the right satellite.**

### **Tools required;**

- ✓ Satellite signal level meter (fully charged).
- ✓ (2) 11mm (7/16") wrenches.
- ✓ Short RG6 test cord to connect between the LNB and the Level Meter.
- ✓ Spirit level or inclinometer.

**Dish preparation: (SKEW and ELEVATION preset for mounting).**



**Clamp mount assembly and LNB secured to dish**



**Skew preset to 118° and all screws/nuts tightened**

# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.2 INSTALL DISH TO MOUNT cont't



It is easier to preset the skew and elevation settings prior to installing the dish on the mount. In some cases, the settings may be difficult to see due to the location of the dish and the position of your ladder.

**Working from ladders makes it difficult to make adjustments - Preset the Skew/Elevation readings prior to installing dish**

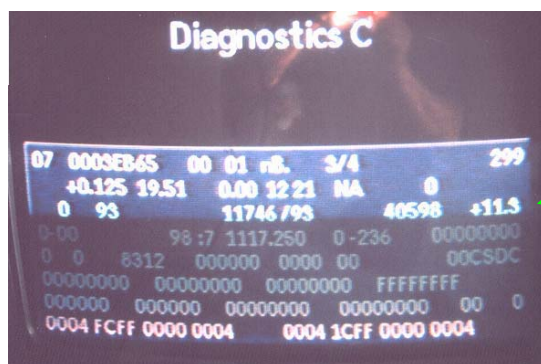


### NOTE:

1. THE SKEW SETTING **WILL NOT** BE CHANGED FROM THE PRESET SETTING OBTAINED FROM THE DUAL SATELLITE LOCATOR CHART. THE ESTABLISHED SETTINGS PROVIDED ARE VERY ACCURATE.

### TIPS:

2. **NEVER** ADJUST THE SKEW USING THE SATELLITE LEVEL METER – THE SKEW CAN **ONLY** BE ACCURATELY ADJUSTED/FINE TUNED WHILE MONITORING THE Eb/No (Bit Energy/Noise) READING ON THE DIAGNOSTICS “C” SCREEN – OPTIONS 6,0,5. (READING TOP RIGHT OF SCREEN)



**Eb/No (Bit Energy/Noise) READING**

3. THE ELEVATION SETTINGS ARE ALSO VERY ACCURATE, HOWEVER THE ELEVATION **MAY NEED MINOR ADJUSTMENTS** WHEN IN THE FINE TUNING STAGE OF THE DISH ALIGNMENT. THIS ADJUSTMENT CAN BE SUCCESSFULLY MADE USING THE SIGNAL LEVEL METER.

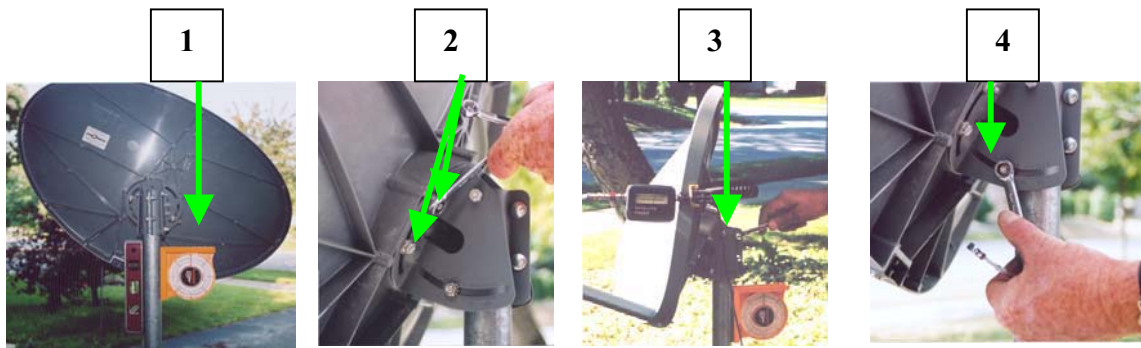
# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.2 INSTALL DISH TO MOUNT cont't

At this point, the dish is installed on the mount and ready to be aligned, however it is recommended that you perform the following:

1. Verify that the mount is plumb.
2. Verify that the mount clamp assembly nuts/screws to the dish are tight- **CAUTION: OVER-TIGHTENING MAY DAMAGE THE PLASTIC THREADS ON THE DISH.**
3. Snug up the 2 nuts that secure the clamp assembly to the mast.
  - **TIP:** Snug the nuts only, as the dish is required to turn **smoothly** on the mast without short jerks.
4. Snug up the elevation nuts



## 6.3 DISH ALIGNMENT

### 6.3.1 GENERAL

Prior to aligning the dish ensure the following:

- Signal level meter is fully charged.
- You have a short RG6 coaxial cable test cord to connect between the LNB and the level meter.
- You have (2) 11mm (7/16") wrenches.
- If working from a ladder, remember to follow the ladder safety rules.
- If possible, locate your meter in a safe place within your reach and ensure it is secured.

**Meter is secured to fence with strap:**

- Easily accessible to make adjustments.
- Hands are free to adjust dish.



# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.2 SATELLITE SIGNAL LEVEL METER

The Satellite Signal Level Meter shown below is a self contained, simple to operate meter that is battery operated by a rechargeable battery. This allows the installer to tune in satellites without test cords running to the satellite receiver or the need to run AC cords.

Like any test instrument or tool, it is only as good as the person operating it. Let's review the basic meter operation.

### REMEMBER

**The Satellite Signal Level Meter is a dumb instrument – it reads the level of ANY satellite signal captured by the dish/LNB – it will NOT identify satellites – this is where your expertise/training/experience takes over.**



The meter is capable of:

- Operating free of AC cords – when properly charged.
- Providing a “battery condition” test prior to use.
- Identifying the presence of satellite signals.
- Adjusting meter indication of signal presence when encountering signals of different signal strengths.
- Checking to ensure the LNB switches polarity and for signal presence on both polarities.
- Provides an audible tone when a signal is present.
- Verifying that the satellite receiver sends the proper voltages (13V and 18V) and they are received by the LNB, when required to change polarity. (V or H).
- Verifying a “basic condition” of cable, connectors and LNB by measuring the current draw between the LNB and the receiver. (Typically 180 – 220 mA)
-



# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.3 SATELLITE FINDER

The Satellite Finder is an economical version of the Satellite Signal Level Meter and as such, has restricted capabilities. This type of a meter is primarily intended for Consumer use, however can be used by the satellite installer if the Satellite Signal Level Meter is not available.

The Satellite Finder shown below is a simple to operate meter that requires the satellite receiver connection to power the meter. This meter allows the installer to tune in satellites when connected “in-line” between the satellite receiver and the LNB.

### REMEMBER

**The Satellite Finder, similar to the Signal Level Meter is a dumb instrument – it reads the level of ANY satellite signal captured by the dish/LNB – it will NOT identify satellites – this is where your expertise/training/experience takes over.**



**NOTE:** The use of an in-line DC Pass attenuator will provide a smoother meter response and may also avoid the meter from being pegged out of range due to high input levels.



3 dB DC Pass attenuator inserted in-line to improve meter response



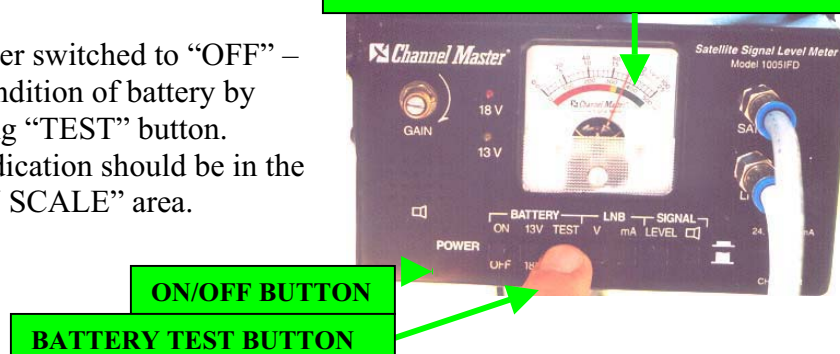
## 6.3.4 INITIAL DISH ALIGNMENT

THE FOLLOWING PROCEDURES WILL ONLY DISCUSS THE METER SHOWN BELOW.

### STEP 1

- With meter switched to “OFF” – check condition of battery by depressing “TEST” button.
- Meter indication should be in the “GREEN SCALE” area.

**METER SHOULD READ IN GREEN SCALE AREA.**





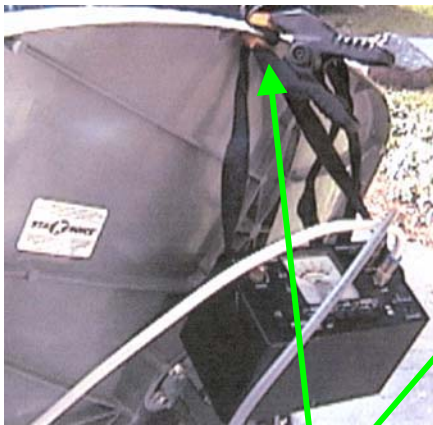
# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.4 INITIAL DISH ALIGNMENT cont'd

### STEP 2

- **Tie off your meter** in a position that you can:
  - Have freedom of both hands needed to adjust the dish.
  - Monitor the meter readings.
  - Secure the meter from falling.
  - Operate the meter controls when required.



**SATELLITE METER IS SECURED TO DISH OR CLAMP ASSEMBLY OR ANY OTHER SECURE LOCATION THAT MAKES IT VISIBLE AND EASY TO OPERATE.**



**SATELLITE FINDER IS CLAMPED TO DISH EDGE WITH A SPRING LOADED "SCISSOR" CLAMP.**

### STEP 3

- On the Satellite Signal Level Meter:
  - Depress the power switch to the "ON" position.
  - Activate the 13V/18V power switch to 13V. The 13V LED should be illuminated.
  - Depress the "LEVEL" and "AUDIBLE" buttons.



**YOU ARE NOW READY TO ALIGN THE DISH**

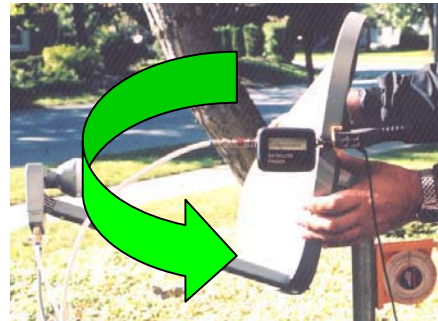
# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.4 INITIAL DISH ALIGNMENT cont'd

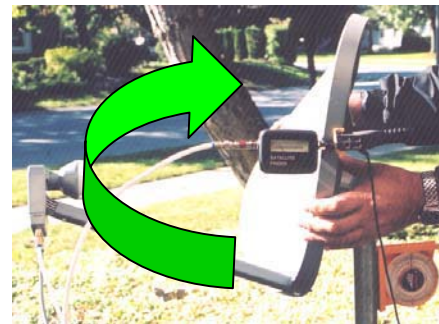
### STEP 4

- Ensure the dish can be smoothly turned on the mast.
- Grab the dish on both outer side edges.
- Turn the dish to your **start point**.
  - In London, Ontario SAT “B” is at 229° therefore, turn the dish to the left approx. ¼ turn (of the mast) from the estimated 229° compass bearing.



### STEP 5

- While monitoring the meter and audible tone, start turning the dish to the right very slowly (when positioned behind the dish).
- As you get close to the satellites positioned **near the elevation setting set on the dish**, you will start to capture signals as shown on the meter. (Remember the illustration in 6.1, page 6.6 that shows why you can capture adjacent satellite signals).
- Once you have captured your 1<sup>st</sup> signal, stop and adjust the “GAIN” control on your meter to center the needle to mid scale.
- It is **recommended that you make a mark** on the mast and clamp assembly to mark the spot.



Adjust “GAIN” control for a mid-scale reading

### REMEMBER

At this point, this may or may not be the Star Choice signal. You will not be sure until you test further. Continue to search for other satellite signals by continuing to turn the dish to the right.

At this point turn the dish very slowly and pay close attention for new signals.

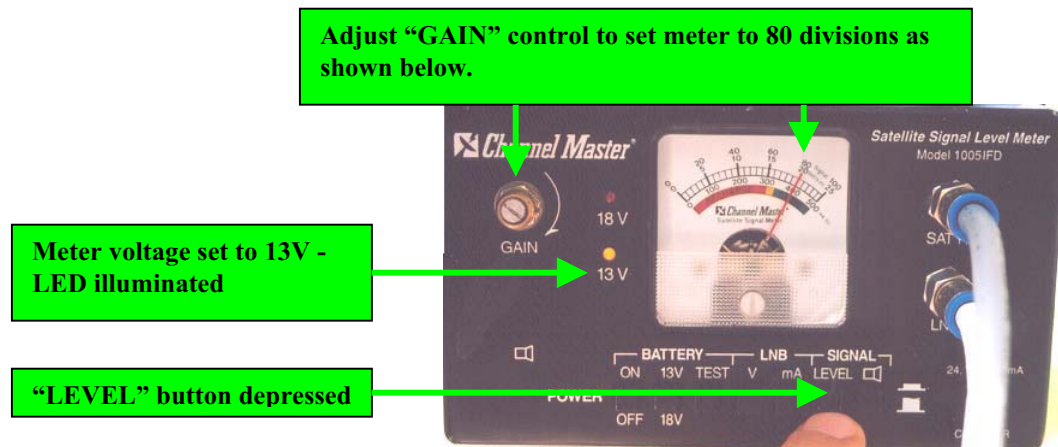
# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.4 INITIAL DISH ALIGNMENT cont'd

### STEP 6

- While turning the dish slowly to the right you will encounter another satellite signal. When the signal is captured, check the meter indication and peak the signal by slightly turning the dish back and forth until maximum signal strength is reached.
- Note the signal strength compared to the previous signal captured. If higher, adjust your meter to the optimum range of your meter (approx. 80 divisions).
- Again, make a mark on the mast and clamp assembly to mark the spot.
- If the level is lower than the initial signal captured, continue turning the dish to the right (See next step).

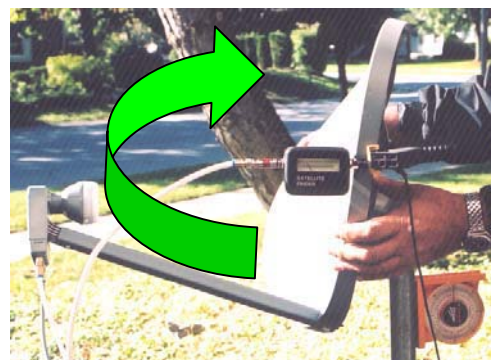


Are you thinking -why set the meter to 80 divisions?

The manufacturer recommends that final adjustments be made with the needle sitting in the 80% range of the meter, as it is the most sensitive and responsive range.

### STEP 7

- With the meter adjusted to 80 divisions and the dish location on the mast marked, continue turning the dish to the right slowly while monitoring again, for another signal.
- Should another signal be captured, verify its level. If higher than the last reading, repeat step 6. If lower than the last reading, ignore and continue turning right for approx.  $\frac{1}{4}$  turn on mast past the compass bearing of 229°.





# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.4 INITIAL DISH ALIGNMENT cont'd

### STEP 7 cont'd

STEP 7



STEP 6

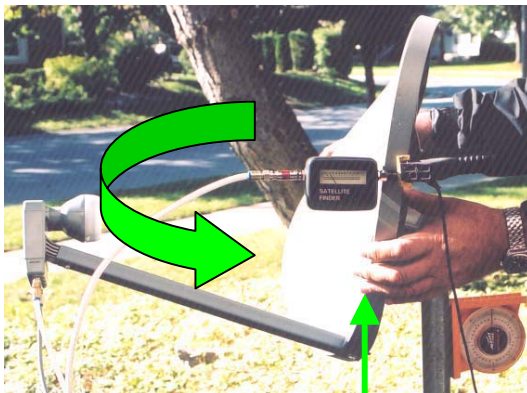


THE READING IN THE LAST STEP (STEP 7) IS LOWER THAN STEP 6

ONCE THE DISH HAS BEEN TURNED  $\frac{1}{4}$  TURN PAST THE COMPASS BEARING AND NO OTHER HIGHER SIGNALS ARE CAPTURED, IT IS TIME TO STOP AND RETURN THE DISH TO THE MARK WHERE THE HIGHEST SIGNAL WAS CAPTURED.

### STEP 8

- Return the dish back to the point where the highest signal was captured.



DISH RETURNED TO POSITION WHERE HIGHEST SIGNAL STRENGTH WAS ATTAINED.



STRONGEST SIGNAL CAPTURED SHOWS A SIGNAL STRENGTH OF 80 DIVISIONS

THE DISH IS NOW READY TO BE FINE TUNED FOR MAXIMUM SIGNAL STRENGTH AND LOCKED DOWN

# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.5 FINE TUNE DISH ALIGNMENT

Fine tuning the dish to capture the highest signal strength possible, reduces the signal interference in adverse weather conditions. The higher the signal - the greater the fade margin – the less chance adverse weather conditions will affect the signal and cause picture failure.

### Fine tuning the Azimuth

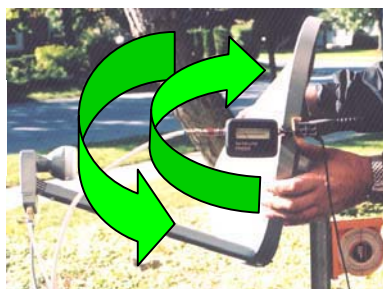
#### STEP 1

- Verify that the meter is adjusted to 80 divisions.

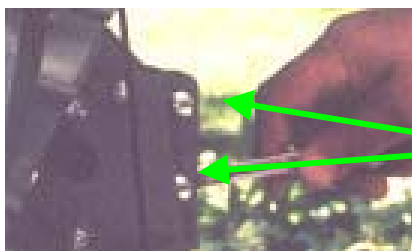


#### STEP 2

- Slightly turn the dish back and forth until the maximum signal is reached.



#### STEP 3



- Once the maximum signal strength is reached, lock down the azimuth position in place by tightening the Azimuth Clamp Bolts on the Clamp Assembly.



# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.5 FINE TUNE DISH ALIGNMENT cont'd

Fine tuning the dish to capture the highest signal strength possible, reduces the signal interference in adverse weather conditions. The higher the signal - the greater the fade margin – the less chance adverse weather conditions will affect the signal and cause picture failure.

### Fine tuning the Elevation

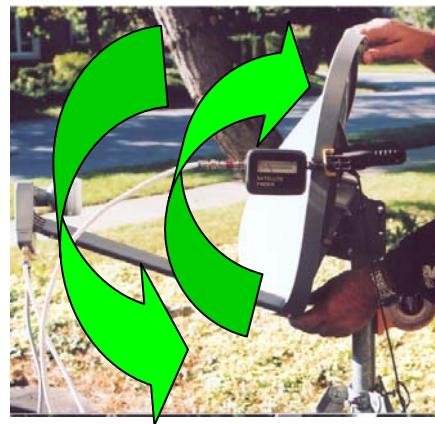
#### STEP 1

- Verify that the meter is adjusted to 80 divisions.

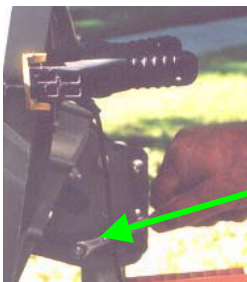


#### STEP 2

- Slightly turn the dish up and down until the maximum signal is reached.



#### STEP 3



- Once the maximum signal strength is reached, lock down the elevation position in place by tightening the two Elevation adjustment nuts. (One on each side)

**THIS COMPLETES THE FINE TUNING ADJUSTMENTS**

# Dish Alignment and Signal Tuning

Revised 22-07-03

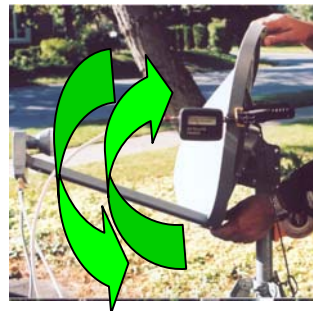
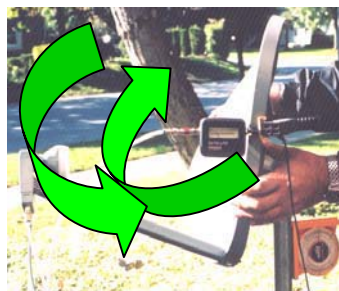
## 6.3.5 FINE TUNE DISH ALIGNMENT cont'd

### FINAL STEP

- Verify ALL bolts and nuts for tightness.



- With meter set to 80 divisions, flex the dish both ways in the Azimuth direction (left and right), and then flex the dish Elevation (up and down) while monitoring closely for any meter movement.



- If any of the final adjustment checks shown above produces an increase in level, the dish **MUST** be loosened and readjusted. Once readjusted, check again for any increase in signal by flexing the dish.
- Once the signal is peaked and verified, the installation is ready to be completed by installing the coaxial cable(s) and grounding system between the dish and the satellite receiver(s).

**THE ABOVE FINAL ADJUSTMENT AND CHECK IS VITAL TO THE “TROUBLE FREE” SYSTEM OPERATION.**

**2-3 DIVISIONS HIGHER ON THE SATELLITE SIGNAL LEVEL METER COULD INCREASE THE SIGNAL LEVEL BY 10%. THE INCREASED SIGNAL LEVEL WILL RESULT IN AN INCREASED FADE MARGIN TO OFFSET ADVERSE WEATHER CONDITIONS.**

# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.6 QUAD LNB OPERATIONAL CHECK

Now that the dish is aligned and fine tuned for maximum signal level, it is recommended to verify the operation of the LNB. The Quad LNB contains internal switching to switch from Vertical to Horizontal or Horizontal to Vertical polarity depending on the channel selection on the satellite receiver and the subsequent voltage sent to the LNB from the satellite receiver.

While the Satellite Signal Level Meter is still connected to the LNB, switch the LNB voltage on the meter from 13V to 18V while monitoring the signal level. In most cases, there may be a slight drop in signal level, however this is normal due to propagation characteristics of signals in the opposite polarity.

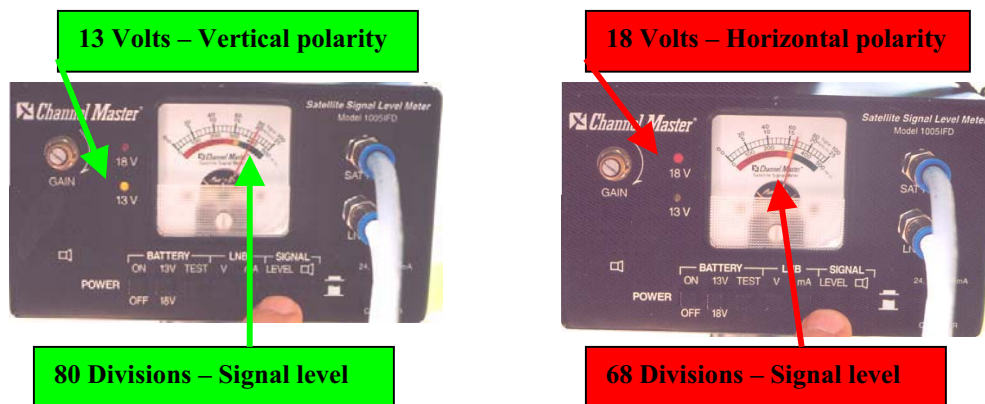
The key points with this test is to ensure:

- The LNB switches to the opposite polarity.
- There is a signal present on the opposite polarity.

Should the level drop slightly, as shown below, DO NOT readjust the dish, as this drop in signal level is normal.

### TIP

**ONCE THE DISH IS ALIGNED AND FINE TUNED TO ONE POLARITY THE OPPOSITE POLARITY IS ALSO FINE TUNED, THEREFORE READJUSTING THE DISH WILL HAVE NO AFFECT TO IMPROVE THE SIGNAL.**



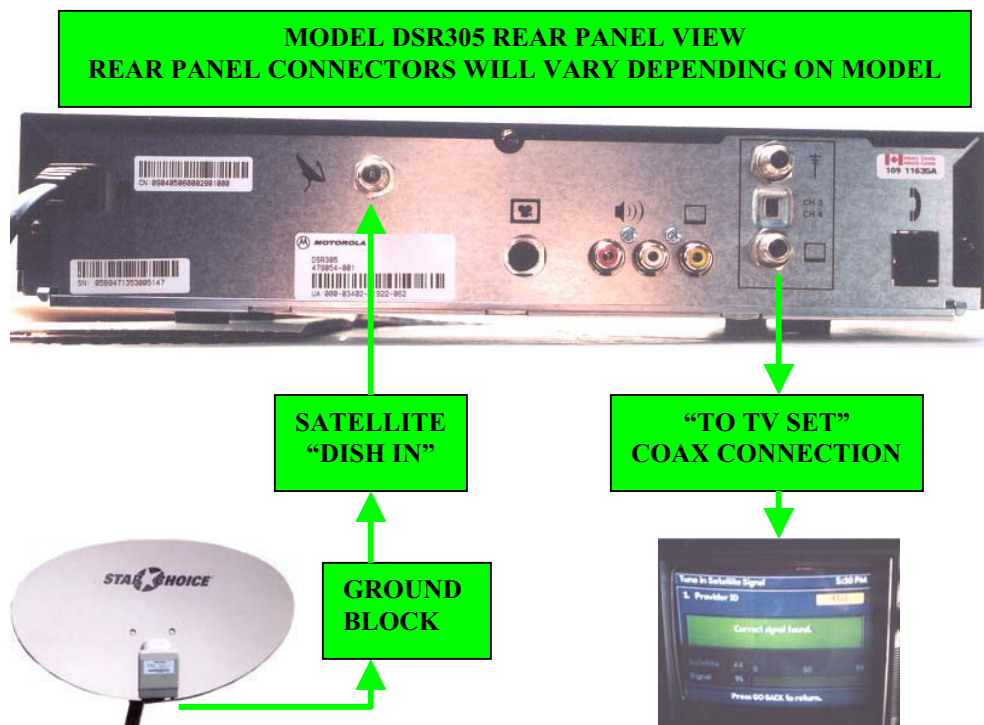
**SLIGHT DIFFERENCES IN SIGNAL LEVEL BETWEEN POLARITIES IS NORMAL - DO NOT ATTEMPT TO ADJUST TO MAKE THE TWO SIGNAL LEVELS THE SAME.**

# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.7 RECEIVER CONNECTION AND SIGNAL VERIFICATION

### 6.3.7.1 BASIC RECEIVER CONNECTION



The basic satellite receiver connection utilizes RG6 coaxial cable between the satellite dish, receiver and TV set. The satellite receiver can be set-up to transmit the TV signal to the TV set on channel 3 or 4. The TV set must be tuned to the same channel as the satellite receiver – channel 3 or 4.

The connection shown above is the “basic” configuration required to establish the Star Choice system. There are various types of connections available for connection between the satellite receiver and the customer’s equipment that are discussed and illustrated in Section 13.0. The available connections vary with the satellite receiver model and the type of equipment owned by the customer.

With the above connections completed and the satellite receiver plugged into the AC outlet, it is time to verify signal presence and quality.

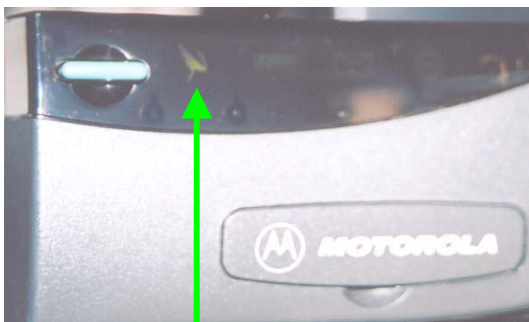
# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.7.2 SIGNAL VERIFICATION

### STEP 1

- Complete the “basic receiver connection” as shown in the previous section.
- Plug the satellite receiver into the AC outlet.
- Allow about one minute for the receiver to power on.
- Tune the satellite receiver to channel 284 or 287 to activate the satellite icon.
- The front panel of the satellite receiver will indicate if the correct Star Choice signal is being received. As shown below, the satellite receiver on the left is receiving the Star Choice signal as indicated by the “GREEN DISH INDICATOR” next to the ON/OFF power switch. The receiver shown on the right is neither receiving a signal nor receiving the Star Choice signal, as indicated by the “RED DISH INDICATOR” next to the ON/OFF power switch.



**GREEN INDICATOR LED SHOWS  
RECEIVER IS RECEIVING THE STAR  
CHOICE SIGNAL**



**RED INDICATOR LED SHOWS  
RECEIVER IS NOT RECEIVING THE  
STAR CHOICE SIGNAL**

### STEP 2

- Select language preference by pressing “OPTIONS”
  - Select 6 (Change Systems Settings)
  - Select 1 (Change Viewing and Language Settings)
- Using the arrow keys, scroll to your language preference.
- Press “ENTER” to make the change.
- Press “EXIT” once to exit from settings.



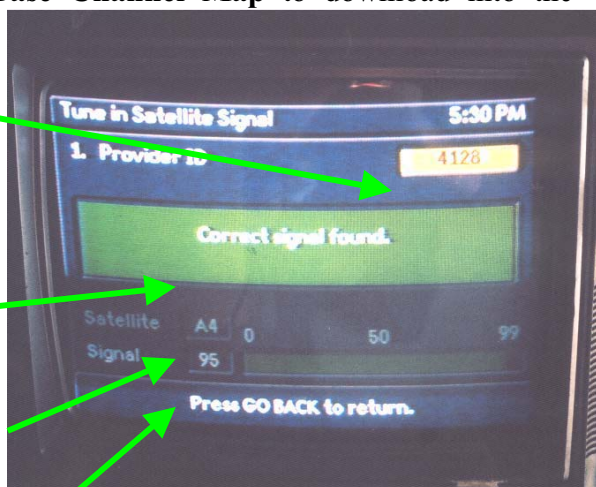
# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.7.2 SIGNAL VERIFICATION cont'd

### STEP 3

- While satellite receiver is tuned to channel 284 or 287, press “OPTIONS”
  - Select 6 (Change System Settings).
  - Select 3 (Change Installation Settings).
  - Select 1 (Tune in Satellite Signal).
- The “Tune in Satellite Signal” box will appear on the screen.
- Allow approx. 5 minutes for the **Base Channel Map** to download into the receiver.
  - Verify correct satellite signal by entering the digits 4128 that will appear in the yellow box to the far right of “Provider ID”.
  - The message “Correct signal found.” will appear to indicate that the Star Choice satellite signal has been captured.
  - Once the **Base Channel Map** download is complete, the digits “A4” will appear in the “Satellite Box”.
- The signal level indicated in this installation is 95.



### **SHOULD ANY OF THE ABOVE CONDITIONS NOT BE MET, YOU MUST START TROUBLESHOOTING PROCEDURES TO VERIFY THE INSTALLATION.**

If you have completed the installation of the dish correctly; and the fine-tuning was successful in obtaining the maximum signal, the level indicated by the “Signal Level Bar” is the maximum you will receive. This level may change from time to time depending on the weather conditions at both the uplink and downlink locations, however it should be stable.

**NOTE:** Although the maximum possible signal level is 99, you will most likely not reach this level. **Weather conditions at both the uplink and downlink locations or type of receiver installed will affect the signal level** from installation to installation. Over a period of time, you will gain experience in what level is attainable in the location you work in. Typically, under ideal weather conditions you should be able to attain a level of 80 or higher.

**FINAL VERIFICATION OF SIGNAL LEVEL MUST BE COMPLETED BY CHECKING THE Eb/No SIGNAL LEVEL CONTAINED IN THE DIAGNOSTIC “C” SCREEN, OPTION 6, 0, 5.**

# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.7.2 SIGNAL VERIFICATION cont'd

The **most accurate method for installers to verify the signal level** is to consult the Diagnostic “C” screen to check the **Eb/No** reading. Access to the diagnostic screens is gained via hidden codes that are not available to the consumer nor should these codes be given out to the consumer.

- Once the Base Channel Map has been downloaded, channel 284 or 287 will not be available.
- Tune to channel 299, press “OPTIONS”
  - Select 6 (Change System Settings).
  - Select 0 (Hidden Code).
  - Select 5 (Diagnostic Data).
  - Diagnostic “A” will appear
  - Depress “RIGHT ARROW” key twice to get to the Diagnostic “C” screen.



Eb/No reading

- Observe the Eb/No reading.
  - Objective: > +8.0 (under ideal weather conditions at both the downlink and uplink locations).
  - Typical readings attainable are +9.5 to +11.5.
- The higher readings will provide a larger “fade margin” in adverse weather conditions resulting in improved service reliability.
- The Eb/No reading is a ratio of “Bit Energy over Noise” that looks at:
  - Signal strength.
  - Incoming signal Bit Error Rate.
  - Level of noise floor.
- As previously mentioned, this reading is the **ONLY** reading that can be monitored should you need to adjust the SKEW setting.

**SHOULD A READING OF >+8.0 (OR THE USUAL READING IN YOUR AREA) NOT BE ATTAINABLE, YOU MUST INVESTIGATE FOR THE CAUSE (S) OF THE LOW READING.**

**REMEMBER – WEATHER CONDITIONS AT YOUR LOCATION (DOWNLINK) AND THE UPLINK LOCATION AS WELL AS PARTIAL SIGNAL BLOCKAGE DUE TO TREES AT YOUR LOCATION CAN AFFECT THE MAXIMUM SIGNAL LEVEL ATTAINABLE.**

**REFER TO SECTION 12.0 “TROUBLESHOOTING” FOR TROUBLESHOOTING TIPS**



# Dish Alignment and Signal Tuning

Revised 22-07-03

## 6.3.8 SYSTEM ACTIVATION

Congratulations, if your installation is completed and you have attained a maximum Eb/No reading, the system is ready for activation.

- Call the Activation Center using the current Installer's Activation Hotline.
- Have ALL the required information available, prior to calling the Activation Center.
  - DO NOT search for receiver serial numbers, UA numbers, customer's programming package, etc. as this wastes valuable time for you and the Activation Center.
- Complete the "Satellite Installation Checklist" and obtain the customers signature. (Refer to ATTACMENT 6.1).
  - IT IS IMPORTANT TO VERIFY THE CUSTOMER INFORMATION WITH THE CUSTOMER AND ALSO VERIFY WITH THE ACTIVATION CENTER TO ENSURE THE STAR CHOICE CUSTOMER INFORMATION IS ACCURATE.
  - **THE INSTALLER COMMENTS ARE VITAL**, SHOULD YOU WISH TO DOCUMENT ANY ABNORMAL SITUATIONS/CONDITIONS THAT YOU IDENTIFIED TO THE CUSTOMER.
    - IE, DAMAGED ROOF, SIDING, FENCE, STRUCTURE, ETC THAT WAS DAMAGED PRIOR TO YOUR INSTALLATION.
    - THIS WILL PROTECT STAR CHOICE FROM LEGAL REPERCUSSIONS – ENSURE CUSTOMER SIGNS-OFF ON THE CHECKLIST AND LEAVE A COPY WITH THE CUSTOMER.
- Proceed with the customer education on the basic operation of their new Star Choice Satellite System and ensure the customer handouts are left with the customer. (Refer to Section 13.0 "Customer Education")



# Dish Alignment and Signal Tuning

Revised 22-07-03

## ATTACHMENT 6.1

The Satellite Installation Checklist must be completely filled out and signed off by you and the customer. Ensure you print clearly and verify the customer information section with the customer and the activation Center.

**NOW IS THE TIME TO VERIFY THE CUSTOMER INFORMATION WITH THE CUSTOMER AND ALSO MAKE ANY CHANGES OR CORRECTIONS WITH THE ACTIVATION CENTER.**

YOU HAVE A CHOICE.

**STAR CHOICE**

Star Choice Television Network (D.S.) Incorporated  
1 Deerfoot Place, 2024-11th Street N.E. Calgary, AB T2E 7L7  
starchoice.com 1-888-954-star fax 1-888-782-7406

Account # 200-12345678

Install Date: JAN 27-02.

### Satellite Installation Checklist

**CUSTOMER INFORMATION** (please print)

Last Name: DOE First Name: JOHN.

Street Address: 45A - WEST ST City: TORONTO Province: ONTARIO Postal Code: L9H 4H5

Home Phone Number: (416) 123-4567 Daytime Contact Number: (905) 789-1011 EXT 401

**INSTALLATION INFORMATION**

BASIC SATELLITE INSTALLATION CONSISTS OF THE FOLLOWING (CHECK ALL THAT HAVE BEEN COMPLETED):

- ☒ Dish assembly and mounting to the Single Family Residential Structure, to the customer's satisfaction
- ☒ Alignment of Satellite dish to receive both F1 and E2 signals
- ☒ Cable run from dish to receiver(s), plus connectors
- ☒ Receiver hook-up to one or more televisions
- ☒ Activation of system and programming
- ☒ Permanent phone line connection for Viewers Choice hook-up and activation ( IPPV )
- ☒ Customer orientation on system features and usage
- ☒ Coax Grounding

**EbNo Readings in diagnostic "C" (greater than +8)**

Anik F1  
Channel 344 +10 Channel 345 +10 Channel 390 +10.5 Channel 398 +10.5 Channel 507 +9

Anik E2  
Channel 292 +9.5 Channel 730 +9.5 Channel 820 +10

Installer Comments: CABLE NOT BURIED ACROSS FLOWER GARDEN - OWNER WILL BURY IN SPRING.

**INSTALLER & CUSTOMER SIGN OFF**

The Star Choice system has been installed to S.C. installation standards, as outlined above, and is functioning properly

Installer Name: BILL SIMMS Customer Name: SHELLY DOE

Signature: Bill Simms Signature: [Signature]

Installer #: 1234 Date: 27-2-02

**VERIFY CUSTOMER INFORMATION WITH THE CUSTOMER AND THE ACTIVATION CENTER**

**CHECK OFF APPLICABLE INSTALLATION ITEMS**

**DOCUMENT EbNo READINGS FROM THE DIAGNOSTIC "C" SCREEN**

**NOTE ANY ABNORMAL CONDITIONS, SITUATIONS, DAMAGE IDENTIFIED TO CUSTOMER, ETC.**

**CUSTOMER AND INSTALLER SIGN-OFF**

# Dish Alignment and Signal Tuning

Revised 22-07-03

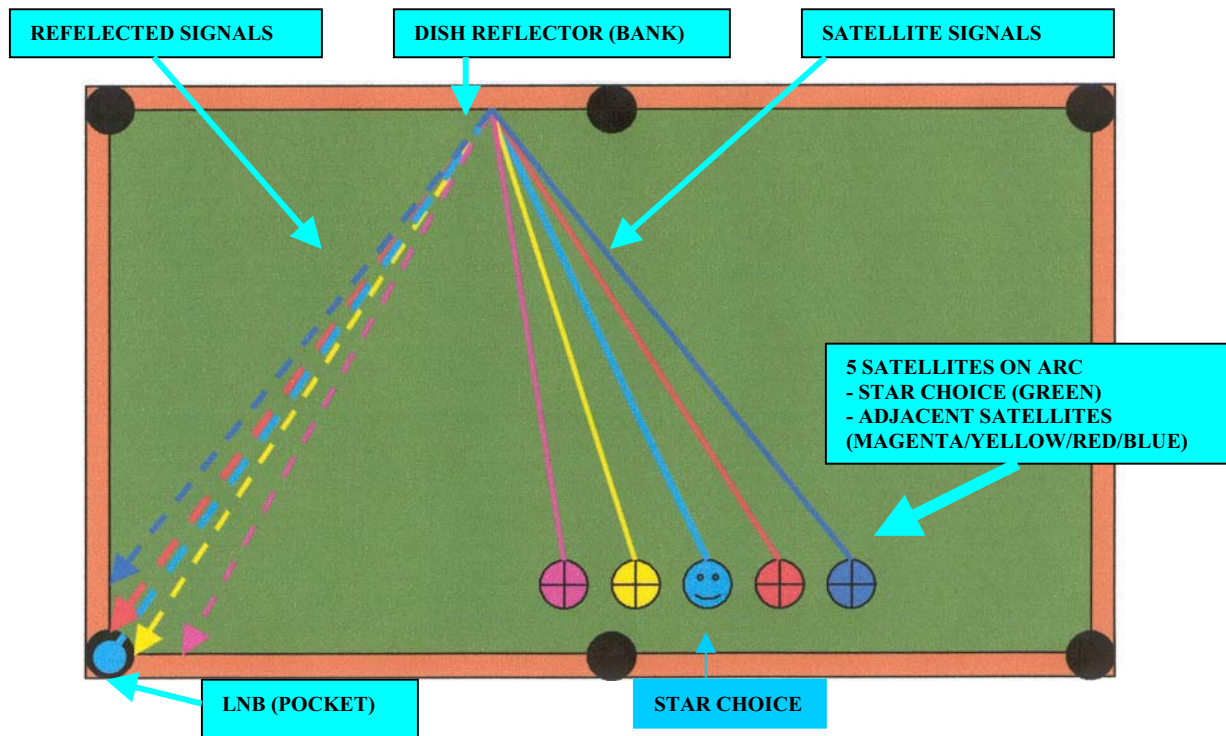
## ATTACHMENT 6-2

### THE SECRET BEHIND THE ANGLE OF REFLECTION AND THE CAPTURING OF THE WANTED SIGNAL BY THE LNB

I'M SURE WE HAVE ALL PLAYED POOL AND KNOW THE IMPORTANCE OF ANGLES ON BANKED SHOTS



PUT YOUR IMAGINATION IN GEAR - THE ILLUSTRATION BELOW WILL HELP UNDERSTAND THE ANGLE OF REFLECTION AND SIGNAL CAPTURE.



- The light blue reflected Star Choice signal is fully captured by the LNB as **all angles are set to capture 100% of the wanted signal (Star Choice) – maximum signal strength on satellite meter.**
- The two closest adjacent reflected signals (yellow and red) are partially captured (approx 50%). The angle of reflection does not permit 100% of the signal to be captured – this is why you will see a lower signal strength on your meter from adjacent satellites.
- The two outside reflected signals are 0% captured – too far from LNB.

**THIS IS WHY STAR CHOICE WILL HAVE THE HIGHEST SIGNAL STRENGTH AND WHY YOU WILL SEE A LOWER SIGNAL STRENGTH FOR ADJACENT SATELLITES.**





## **INSTALLATION HANDBOOK**

### **7.0**

#### **EXTERIOR COAXIAL WIRING DISH TO RECEIVER**

**ENSURE YOU ARE FAMILIAR AND ADHERE TO THE RECOMMENDED  
CABLE AND CONNECTOR STANDARDS AND POLICIES IN CHAPTER 3.0**

## 7.1 CUSTOMER APPROVAL

Upon completion of the site survey, the customer is required to approve the proposed installation. To this end, you should fully explain the work to be done and have the customer approve the work before beginning.

The customer should understand where the satellite dish will be installed and the route of the download(s) into the home. You should let the customer state what he or she wants in relation to the installation and you should try to accommodate those concerns as fully as possible. You should then ask to see the location of the television set(s) to be connected and show the customer the best location for the digital satellite receiver(s) and explain how the installation will be performed. This includes making clear exactly where the holes will be drilled into the home and all openings will be weatherproofed against water leakage.



**THE INSTALLATION PROCESS SHOULD NOT BEGIN UNTIL THE CUSTOMER UNDERSTANDS AND HAS APPROVED THE PROPOSED INSTALLATION.**

## 7.2 PLANNING WIRE RUNS

The appearance of cable runs is an area of high concern to any property owner and aesthetic considerations dictate that all wires should be concealed as fully as possible. Customers do not want to see “spider webs” of cables hanging all over their homes. For this reason, cables should only be run down and along “side or back” walls, never diagonally. If at all possible, the wires should follow the lines and contours of the walls and run along any facing structures that can serve to conceal their presence. Download cables can be concealed under eaves or along drain spouts or decorative trim. Star Choice would prefer not to see any cables run on a front wall or along a front roofline.

For best appearance, the cable runs should lie either vertically or horizontally and never run diagonally from one point to the next. Given all these restraints, cable runs should be kept as short as possible (maximum 46m - 150 feet for Quad LNBs) to reduce cable loss and maintain maximum signal level.

While planning the cable route to follow the contour of the home, bear in mind that the cable bending radii must be 10 times the outside diameter of the cable when routing bends and drip loops. RG6 coaxial cable should have a minimum-bending radius of 7.5 cm (3 in.) (15cm - 6 in. diameter).



**SHARP BENDS, KINKS OR CRIMPS CAUSED BY IMPROPER STAPLES OR CLIPS WILL ALTER THE CABLE'S IMPEDANCE AND RESULT IN SIGNAL REFLECTIONS, ADDITIONAL ATTENUATION AND POSSIBLE LOSS OF SERVICE.**

## 7.3 GUIDELINES for WIRE RUNS and SECURING WIRING

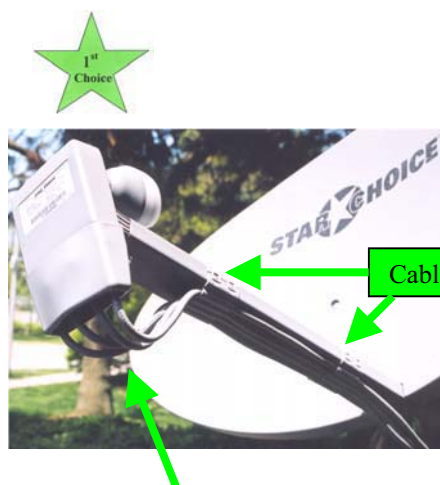
### 7.3.1 DISH WIRING

- Only Star Choice approved RG6 coaxial cable with UV protection that has been tested to 2050 MHz should be used between the dish and the digital satellite receiver(s) as the use of lower grade coaxial cable such as RG59 may result in excessive signal loss. RG59 coax cable is **ONLY** recommended for use between the satellite receiver and the TV set(s). **Refer to 14.0 “Approved Parts List” for approved cable details.**
- When planning the coax cable runs keep in mind the recommended maximum cable length between the dish and the receiver is 45m (150 feet). Excessive cable lengths will increase signal loss and also reduce the voltages (from the satellite receiver) required to properly operate the LNB(s).
- Only Star Choice approved cable connectors can be used to connectorize the coax cables. The 2 samples below are used for RG6 and RG59 cable. Both are weatherproof connectors that have inner and outer rubber “O” rings and they should be inspected to ensure they are free from dirt and the “O” rings are properly seated. **(REFER TO CHAPTER 3.0 FOR CABLE/CONNECTOR STANDARDS)**



**RUBBER “O” RINGS ARE IN TACT, CLEAN & AND PROPERLY SEATED**

- Routing of the coax download from the LNB to the base of the universal mount assembly **should have drip loop(s) whenever possible** that do not exceed the minimum bending radius of the cable.
- The coax download between the LNB and the dish mount must be properly secured to the feed support arm with the cable clips provided (Integrated 60E Quad LNBF Assembly) or in the case of the earlier vintage of dishes the coax download must be routed inside the feed support arm.



**Drip loops**



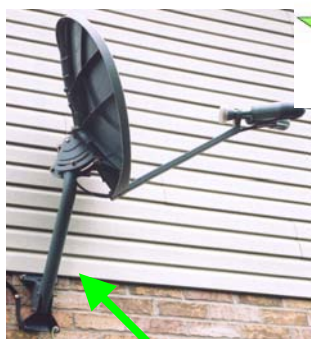
**No cable clips & bending radius too tight on top photo**

## 7.3.1 DISH WIRING cont'd





FOR BEST APPEARANCE WOULD YOU PREFER THE TOP LEFT OR RIGHT ON YOUR OWN HOME?

**YOU BE THE JUDGE!!!!**



**1<sup>st</sup> Choice**





**BAD Choice**

**1<sup>st</sup> Choice:**

- Cable routed inside feed support arm.
- Cable routed inside pipe mount.

**Bad Choice:**

- Cable taped to feed support arm and also pipe mount.
- Drip loop off LNB too sharp.

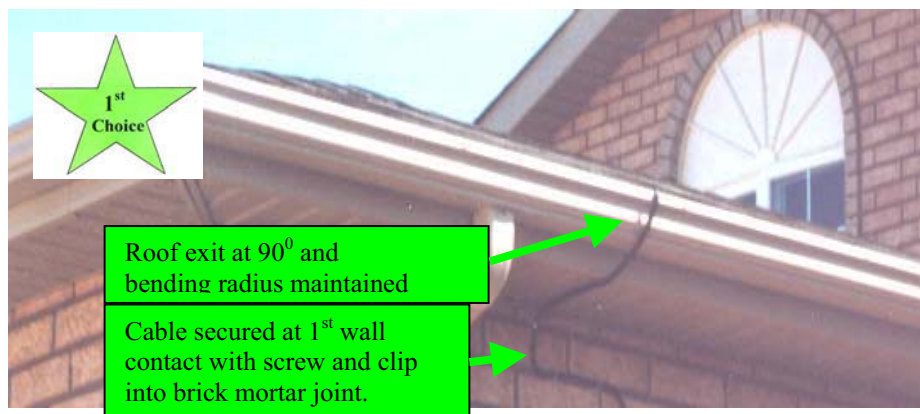
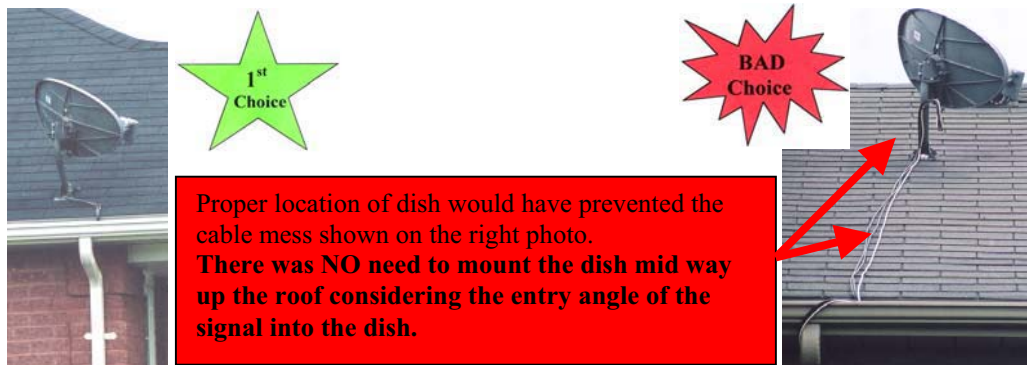


- When an extension mast is required to gain minimum dish height the cable should be secured to the mast with four wraps of approved electrical tape or tie wraps properly tightened, no less than every 76 cm (30 in.).
- If plastic tie wraps are used, be very careful **NOT** to over tighten as this will crimp the coaxial cable and possibly cause signal degradation.

Coax downlead secured to extension mast every 76 cm (30 in.) or less

## 7.3.2 OFF-ROOF WIRING

- When it is required to install a dish on the roof, cable runs must take the most direct route on the roof to minimize contact with the roof membrane while maintaining concealment as much as possible.
- No staples, screws or nails should penetrate the roof membrane for the purpose of securing the downlead.
- Shingles or flashings should **NOT** be lifted to assist in securing downloads as this will break the seal and allow wind to break the shingle or allow water to blow under the shingle or flashing and damage the roof membrane.
- Run the downlead to the entrance point as close as possible to the customer's TV location.

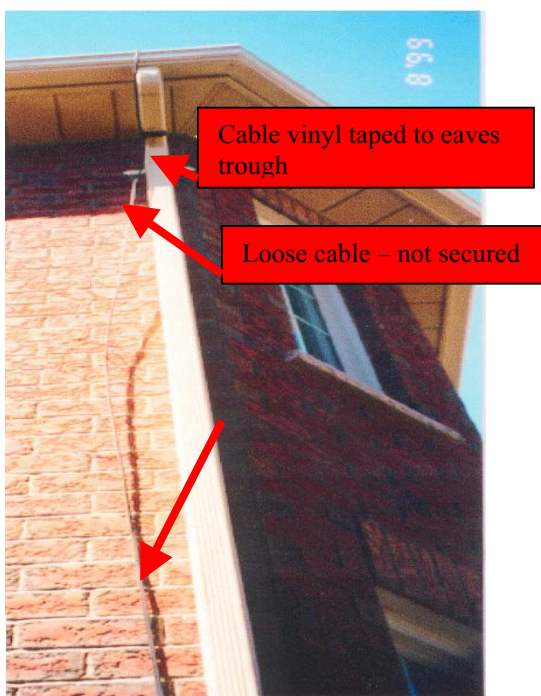


### REQUIREMENTS:

- Come off roof at 90° to eaves trough.
- Maintain cable-bending radius.
- Cable run in eaves trough should be secured every 1.2-1.8m (4-6 ft.).
- Cable secured at 1<sup>st</sup> wall contact with proper screw and clip into mortar joint.



## 7.3.2 OFF-ROOF WIRING cont'd



### UNACCEPTABLE:

- Cable vinyl taped to eaves trough.
- Cable NOT secured to wall.

### REQUIREMENTS:

- Never screw anything into eave trough, weather flashing or downspouts. Avoid tie-wrapping cables to downspout, cables must be clipped to wall beside downspout.
- Secure cable off roof at the first point of contact with the wall.
- Secure cable with clips/screws into mortar joints every 76cm (30 in.) maximum spacing on vertical runs.
- Only approved cable clips should be used to attach the cable to the walls.
- Cables installed to brick or other multiple-piece masonry walls should be attached only into the mortar, never into the brick or block itself.

- All clips will be fastened with screws and anchors on masonry type structures.

### **SHOULD THERE BE A NEED TO MOUNT THE DISH ON THE ROOF, MOUNT AS CLOSE TO THE EDGE OF THE ROOF AS POSSIBLE.**

- Ensure cable exits roof on a direct vertical route from dish to roof edge, this will prevent trapping ice, snow and debris.
- 

If the cable needs to be routed a long distance around the home the following is acceptable with approval and sign off from homeowner:

- When using the eaves trough to route the cable around the home, lie the cable **on top of the support nails at the front of the trough, furthest away from the shingles, and secure with Tie wraps**, being careful not to over tighten pinching the cable.

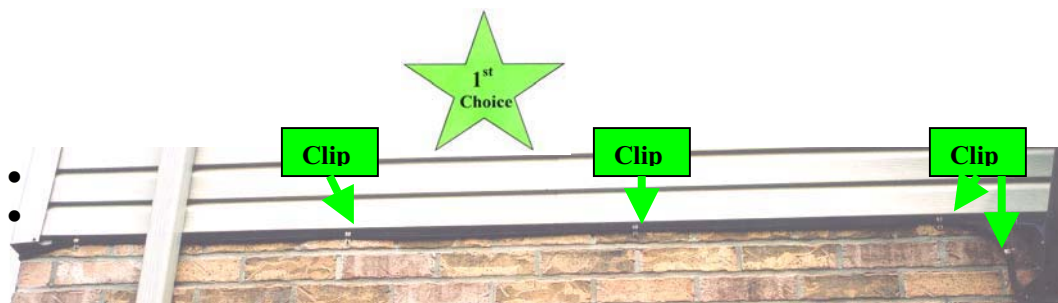
## 7.3.3 HORIZONTAL WIRING RUNS

- Cables are secured to the structure **every 60cm (24 in.) on horizontal** and **every 76cm (30 in.) on vertical runs**, maintaining even spacing distance between clips. If a maximum distance of 60 or 76cm (24 or 30 in.) is not possible, shorter “even spacing” is permitted.
- All exterior wall cable runs should either be vertical or horizontal following the contour of the building structure, utilizing facing structures where possible, to conceal their presence. Do NOT run cables diagonally from one point to the next



### UNACCEPTABLE:

- This system installed 8 days ago
- Cable has started to sag
- Cable clips are too far apart (approx. 100cm (40 in.)).

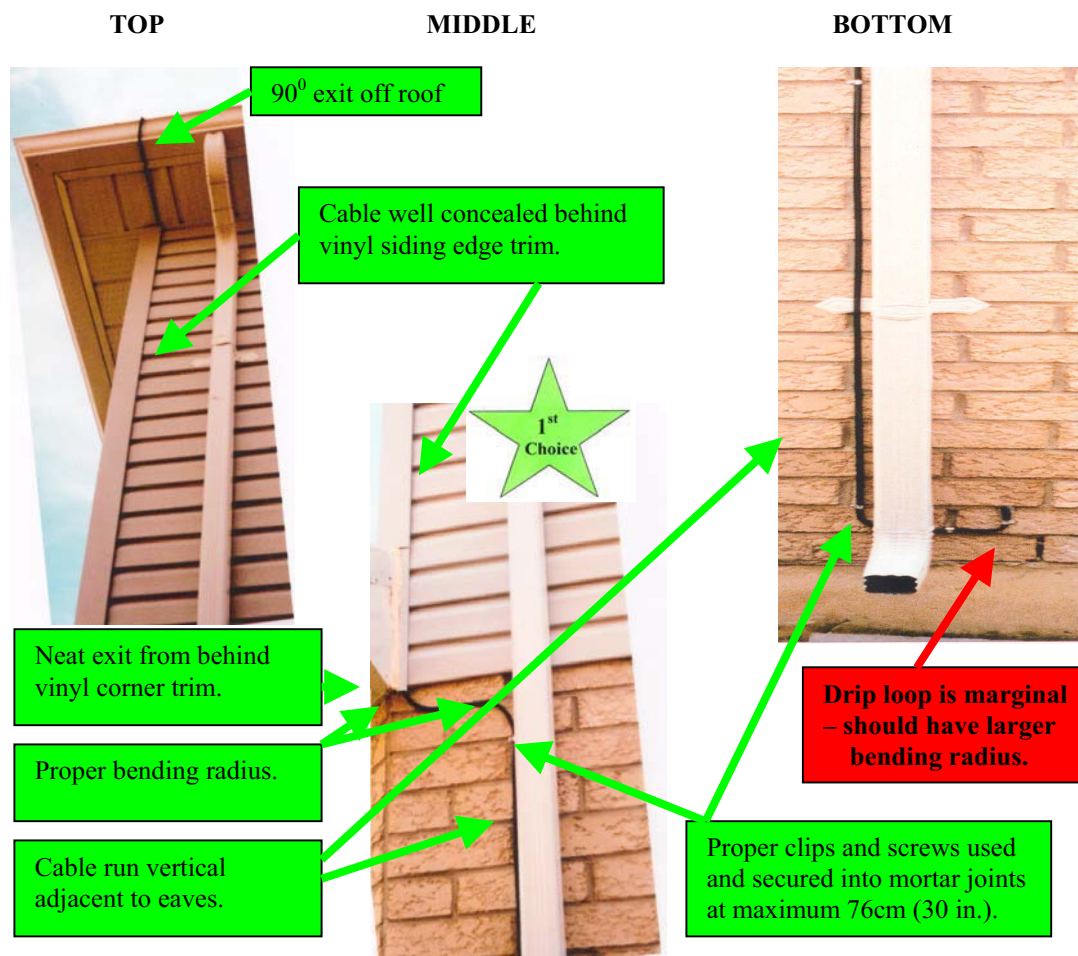


### ACCEPTABLE:

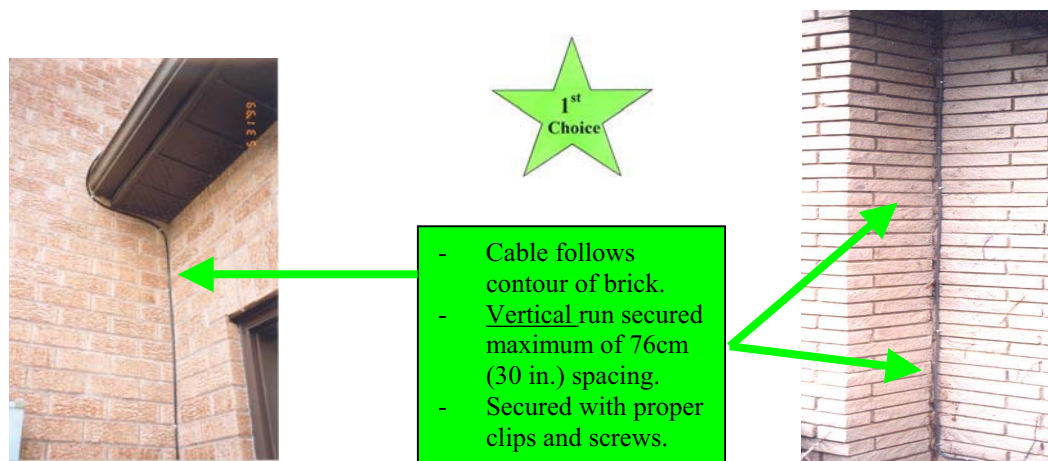
- This system installed 3 MONTHS ago
- Cable is straight and tight to siding contour.
- Cable clips approx. 60cm (24 in.) apart and consistent distances.

SUPPORT HORIZONTAL RUN CABLES EVERY **60cm (24 in.)** WITH APPROVED CABLE CLIPS/ANCHORS

## 7.3.4 VERTICAL WIRING RUNS

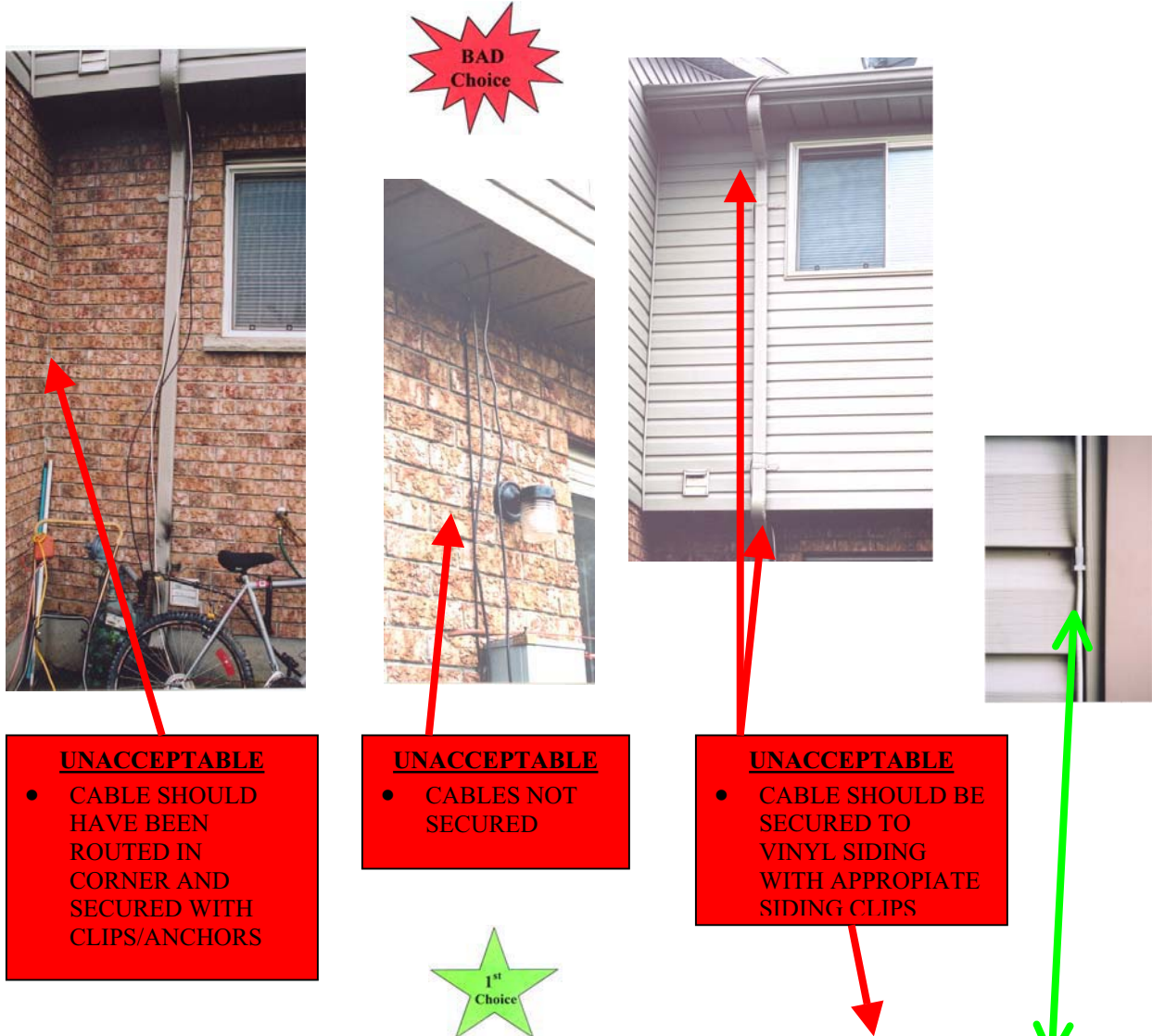


The vertical cable runs in these photos demonstrate a quality installation following most proper installation practices. The **only exception** is the **drip loop** that should have a bending radius of approx. 15cm (6 in.) in diameter.

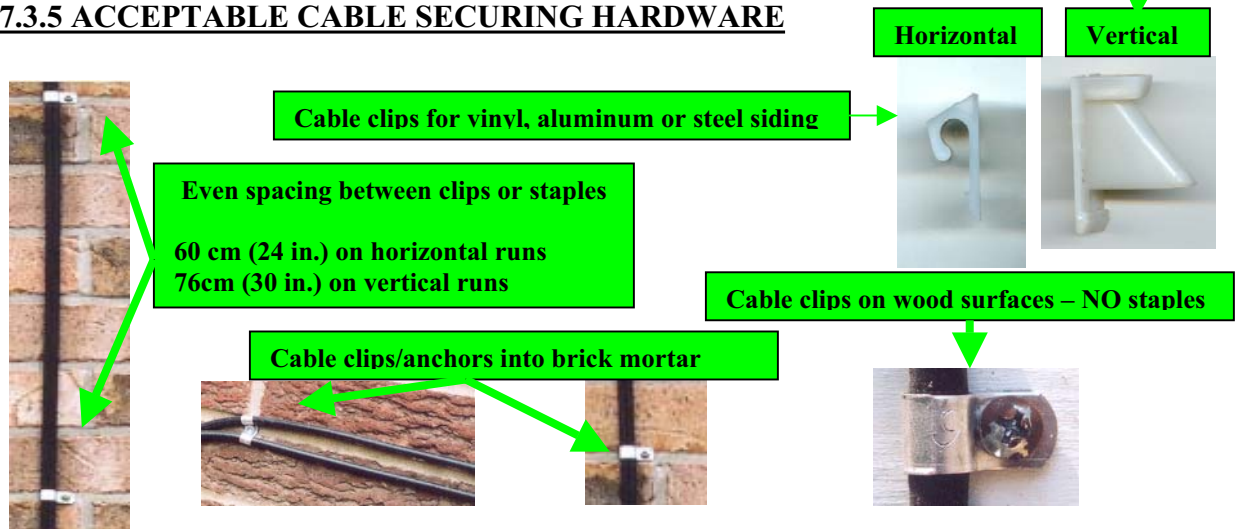




## 7.3.4 VERTICAL WIRING RUNS cont'd

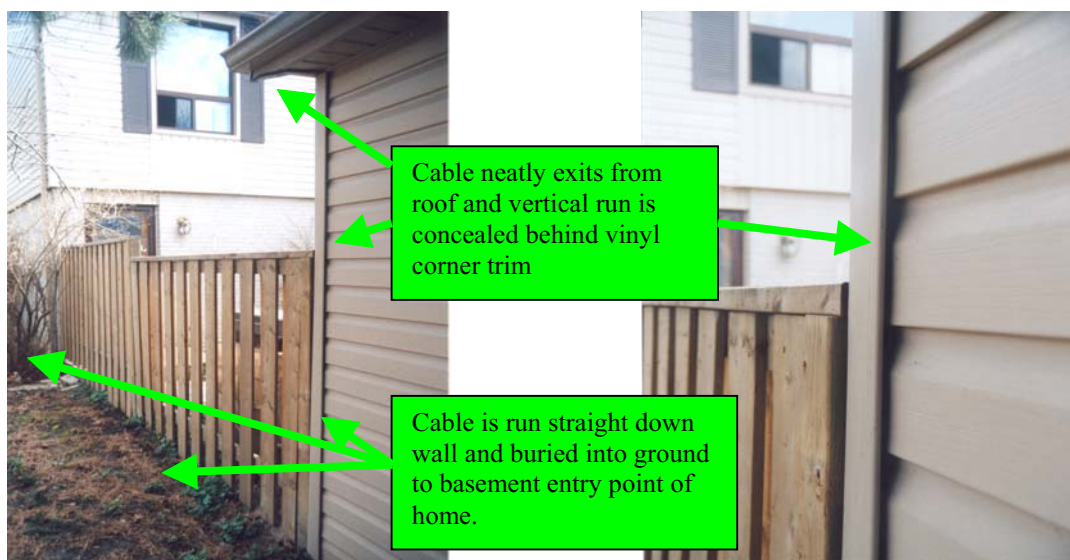


## 7.3.5 ACCEPTABLE CABLE SECURING HARDWARE



## 7.3.6 WIRING FROM DETACHED STRUCTURES

- Should the satellite dish need to be installed on a non-attached structure such as a garage, tool shed, tree, fence post, pole, etc. burial of a portion of the cable may be required. Only approved cable should be used and buried at a minimum depth of 15-20cm (6-8 in.).
- Should a fence be available to secure the cable between the dish and the home ensure it is installed **as low as possible, concealed and secured at regular intervals.**

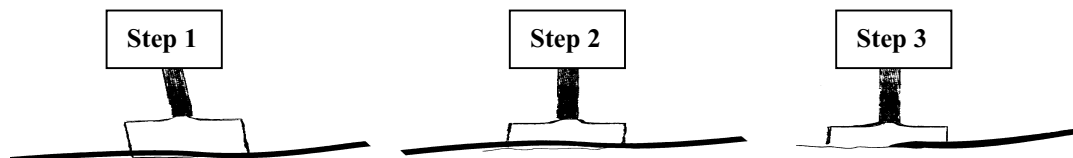


### UNACCEPTABLE

- Cable should have been routed on lower cross arm or buried if possible.
- Cable is not secured to fence
- Cable has kinks and is not secured.



## 7.3.7 BURIED WIRING RUNS



It may be necessary to locate the satellite dish some distance away from the home on another structure such as a garage, garden shed, tree, fence post, pole, etc. In such cases, often the best routing for the cable is under the ground.

Determining the route to bury the cable is not difficult nor is the actual burying of the cable itself. The cable need only be 15-20cm (6-8 in.) below the surface so it can easily be done with a flat blade garden shovel.

**Step 1:** Ensure that there are no large tree roots or rocks on the route the cable is to be laid or that it is not a location that may be dug up later such as a garden. Lay the cable on the ground over the route it will be buried.

**Step 2:** Place the shovel tip over the top of the cable parallel to the cable and push the blade as deep as possible. Push the shovel handle forward so that the ground opens up, then push the cable into the cut behind the shovel.

**Step 3:** Pull the shovel handle back towards you letting the cut in the ground close, burying the cable. Move the shovel blade one width and repeat for the entire cable length. Tap the earth or sod down over the cable when the job is completed. After a short time the location of the cable will disappear from view.

**NOTE:** Ensure entry point into home is at least 30cm (12 in.) above ground to prevent moisture from entering into the foundation.

## 7.3.8 DETERMINING WIRING ENTRY POINT



**PRIOR TO ANY DRILLING, MAKE SURE YOU KNOW WHERE THE DRILL BIT WILL COME THROUGH THE OUTSIDE WALL OF THE CUSTOMER'S HOME. PAY PARTICULAR ATTENTION TO THE LOCATION OF GAS METERS, WATER PIPES, ELECTRICAL WIRING/CONDUIT, EXTERIOR LIGHTS OR OTHER FIXTURES SUCH AS SHUTTERS, AIR CONDITIONERS AND LINES, ETC. IN ORDER TO AVOID DRILLING INTO THEM.**

**TO BE SAFE, FOLLOW THE OLD CRAFTSMAN'S ADAGE:**

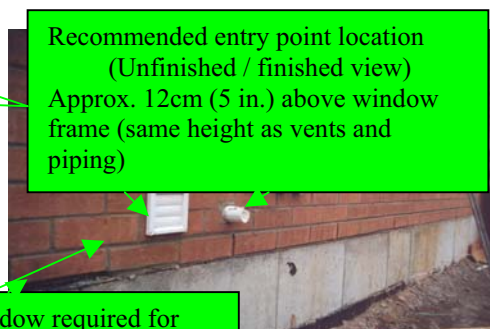
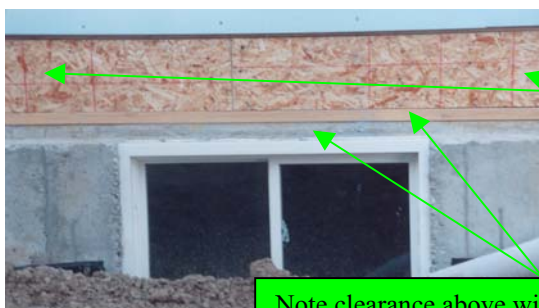
**MEASURE TWICE, DRILL ONCE**

### MEASURING TIPS (STANDARD CONSTRUCTION METHODS)

**"UNFINISHED"**

**(SAME HOME – BASEMENT ENTRY)**

**"FINISHED"**



**Recommended entry point location  
(Unfinished / finished view)  
Approx. 12cm (5 in.) above window  
frame (same height as vents and  
piping)**

**Note clearance above window required for  
unobstructed entry hole due to:**

- Approx. 5cm (2 in.) cement ledge and
- Bottom stud plate sitting on foundation

**"EXTERIOR WALL"**

**(SAME HOME – WALL ENTRY)**

**"INTERIOR WALL"**



**Recommended location for  
drilling directly into home for  
wall plate installation**



**When direct entry is made into living quarters  
observe location of electrical outlets and wire run.**

- Outlets are at standard height throughout home
- Electrical wiring usually rises from electrical box then across to adjacent outlets

## 7.3.9 DRILLING WIRE ENTRY POINT



### **MEASURE TWICE, DRILL ONCE**

When drilling the entrance hole, consider slanting the drill slightly so the hole is a little lower on the outside than on the inside, as this will prevent water from entering the walls.

When drilling the cable entrance hole into the customer's home, it is important that you be aware of the potential damage that can be caused when drilling through walls. To minimize the aesthetic impact, not to mention the possible damage, holes should almost always be drilled from the inside of the home out but only after verifying that the drill bit will avoid any structures that may exist on the outside walls.

Exceptions to the "inside out" rule would include homes with brick or vinyl siding, where the drill bit's punching through the cold plastic may cause it to shatter. Always notify the customer of the exact location of the cable entry point before drilling.

#### **TIPS:**

- The drill bit always makes a larger hole when exiting the material being drilled than it does going in, especially if pushed hard and not allowed to clear itself of debris.
- Slate, vinyl, stucco and asphalt siding are thin, brittle materials that break easily therefore are usually drilled from the outside in.
- Only masonry bits in good condition should be used on masonry walls. While more expensive, a quality masonry bit is quicker and cheaper than repairing a damaged masonry wall.
- Lighter than normal pressure should be applied on the drill when it is "breaking through" the siding to prevent chipping and cracking of exterior.
- Bricks are brittle and can break/chip when the drill bit exits, therefore brick walls should be drilled from the outside in through the mortar between the bricks.
- Ensure all entry points have a cable drip loop and the hole is sealed with an approved sealant



**IF THERE IS ANY QUESTION AS TO THE LOCATION OF POSSIBLE OBSTRUCTIONS TO DRILLING, PRECISELY MEASURE FROM A COMMON REFERENCE POINT ON THE INSIDE AND OUTSIDE OF THE WALL TO THE DESIRED LOCATION OF THE HOLE TO ENSURE ADEQUATE CLEARANCE.**

## 7.3.10 DRIP LOOP AND ENTRY POINT SEALING

Cable entrances into the customer's home from the exterior of the house provide a possible point for water seepage or ingress, which will **cause damage to the interior of the home.**

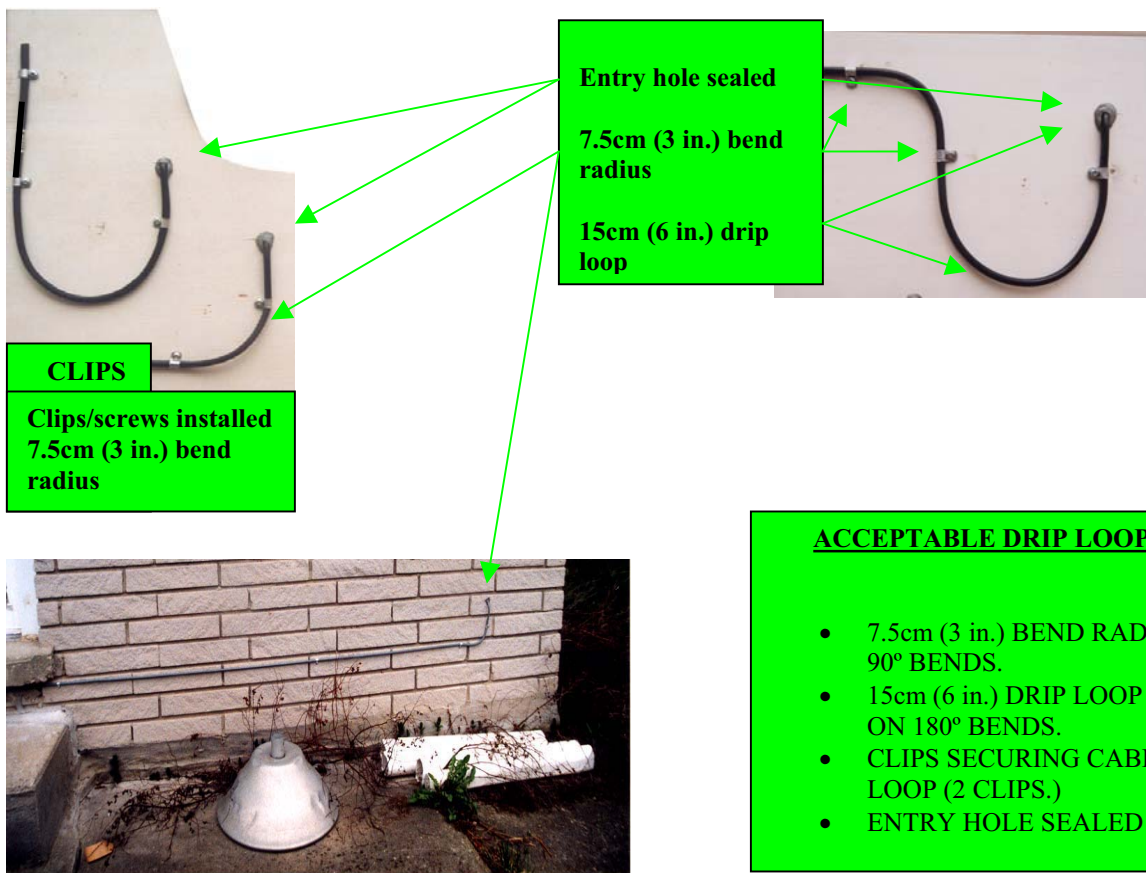
Whenever a cable enters via a hole drilled into the customer's home, the hole must be sealed against water entry with an approved sealant.

The cable itself must have a recommended drip loop at the entry point so that any water running down the cable drips off the bottom of the cable and does not enter the home.

It is also recommended that any entry point holes be drilled at a slight downward angle to the outside that will also assist in preventing water from seeping into the home. (Water does not run uphill)



### ACCEPTABLE SAMPLES



### ACCEPTABLE DRIP LOOP TIPS

- 7.5cm (3 in.) BEND RADIUS ON 90° BENDS.
- 15cm (6 in.) DRIP LOOP RADIUS ON 180° BENDS.
- CLIPS SECURING CABLE DRIP LOOP (2 CLIPS.)
- ENTRY HOLE SEALED

## 7.3.10 DRIP LOOP AND ENTRY POINT SEALING cont'd



**SHARP BENDS, KINKS OR CRIMPS CAUSED BY IMPROPER STAPLES OR CLIPS WILL ALTER THE CABLE'S IMPEDANCE AND RESULT IN SIGNAL REFLECTIONS, ADDITIONAL ATTENUATION AND POSSIBLE LOSS OF SERVICE ALTOGETHER.**



## 7.4 WIRING GUIDELINE SUMMARY

**ENSURE YOU ARE FAMILIAR AND ADHERE TO THE RECOMMENDED CABLE AND CONNECTOR STANDARDS AND POLICIES IN CHAPTER 3.0**

### SECURING CABLE RULES

**ONLY CLIPS/SCREWS ON EXTERIOR AND ONLY SCREWS/CLIPS OR INSULATED STAPLES ON INTERIOR**

### **OTHER GUIDELINES:**

- Cables to follow contour of building structure.
- Vertical and horizontal runs ONLY.....NO diagonal runs.
- Proper clips/screws at recommended spacing of 60cm (24 in.) on horizontal runs and 76cm (30 in.) on vertical runs.
- DO NOT use screws in vinyl, aluminum or metal siding...**USE appropriate siding clips.**
- Entry hole properly sealed, proper bending radius and secured drip loop.
- Neatly drilled entry hole, NO blow out holes.
- Externally mounted ground blocks, splitters, multi-switches, etc should be mounted at a convenient location 1.2-1.5m (4-5 ft.) above the ground to present a less attractive target for children or pets.
- Cable cuts or jacket separation shall NOT be taped; replacement of the cable will be required. Where possible, there should be one continuous piece of cable from the dish to the ground block and from the ground block to the digital satellite receiver.
- Maximum wiring length from the dish to the receiver is 45m (150 ft.) of approved **RG6 cable**.
- Do NOT re-use existing RG59 wiring unless there is **no other option available** and if used, it must be thoroughly inspected to ensure it is in good shape. Replace all connectors and remove all splitters.

**EXISTING, POORLY INSTALLED CONNECTORS ARE THE MAIN CAUSE OF SERVICE CALLS AND SERVICE OUTAGES.**



**REPLACE ALL EXISTING CONNECTORS**



## **INSTALLATION HANDBOOK**

### **8.0**

#### **INTERIOR COAXIAL WIRING**

#### **DISH TO RECEIVER**

## 8.1 INTERNAL WIRING

Internal wiring refers to the coaxial cable from the entry point into the home from outside, to the digital satellite receiver, multiple receivers or between the digital satellite receiver and all television sets. The cabling may be a new cable run or reuse of an existing cable run.

When running new cable inside the customer's home, always strive to conceal the cable from view, as much as possible.

The installer **may install prewires or fish walls** at the Customer's request, only after determining the feasibility of the work and only with permission from the owner of the building.

When reusing existing cable(s) between the dish and one or more digital satellite receiver(s) or from the digital satellite receiver to TV sets it is critical that the condition of the cable be inspected to ensure it meets Star Choice standards stated in Section 3.0. ALL existing coaxial cable connectors should be replaced as a standard procedure and the cable should be re-secured if it is not neatly attached to the building structure.

### CAUTION!!



**Any coaxial cable utilized to carry Star Choice signals must meet coaxial cable installation standards covered Section 3.0. This Policy will**

**include new cable runs as well as reused cable runs and cable structures.**

**REPLACE ALL EXISTING CONNECTORS**



## 8.2 WALL PLATES

The 3 common installations pertaining to the use of wall plates:

- 1 – New wall plates in an older home.
- 2 – New wall plates in an older home with previous service and pre-wired wall outlets.
- 3 – New wall plates in a new pre-wired home.



In all of the above cases, the cable should be installed or existing cable inspected to ensure there are no cable kinks inside the cable box and there is no stress on the wall plate's F-81 connector inside the cable box. **IF THE WALL PLATE IS PROVIDING SERVICE BETWEEN THE DISH AND THE STAR CHOICE SATELLITE RECEIVER ENSURE THE F81 CONNECTOR IS THE HIGH FREQUENCY CONNECTOR, IF NOT REPLACE.**

## 8.2 WALL PLATES cont'd

When wall plates are utilized, there will be a jumper cable between the wall plate outlet and the digital satellite receiver that may vary in length depending on the distance to the TV set. In those cases where the length of the jumper cable exceeds 1.8-2.4m (6-8 ft.), it is important to take steps to prevent the customer from tripping over the loose cable and either injuring himself or causing damage to the digital satellite receiver or the customer's equipment. The jumper cable may have to be secured to the baseboard or other structure with approved cable clips.

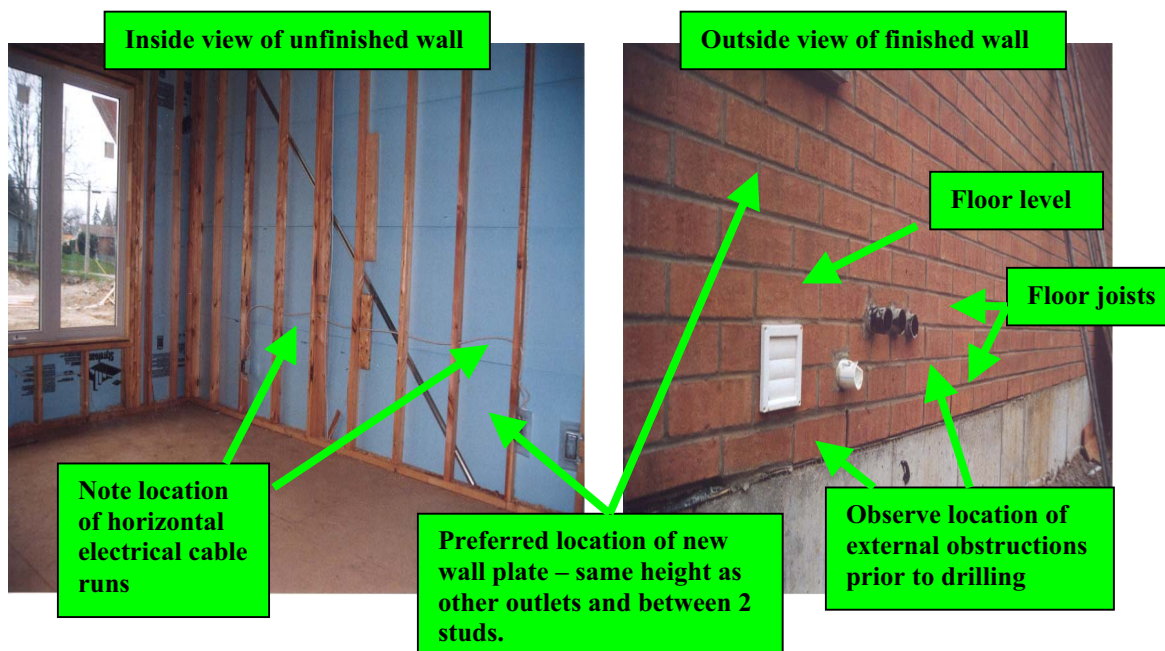
Installing new wall plates in an existing home with no pre-wire installed is a preferred and easy method to complete the installation providing the cable run is coming from a ground block and caution is exercised when drilling through the exterior wall.



**OBSERVE All entry point drilling precautions covered in the previous section.**

Take all the necessary measurements from the inside and verify on the exterior that there are no obstructions. The location of the wall plate should be at the same height as the existing wall plates in the room, which in most cases may be either electrical or telephone outlets. Once the location has been selected, drill the entry point and install the wall plate. Be aware of horizontal electrical runs (see picture below) joining other electrical outlets. Vertical electrical runs usually run up from the box and then horizontally to the next outlet. It is always recommended to **install a new outlet between the wall studs** as wall studs are used to secure cables for vertical runs to adjacent floors.

The wall plate must be securely fastened to the interior wall with the appropriate fasteners. In most cases today, the interior walls are drywall and will require plastic anchors and screws or equivalent.

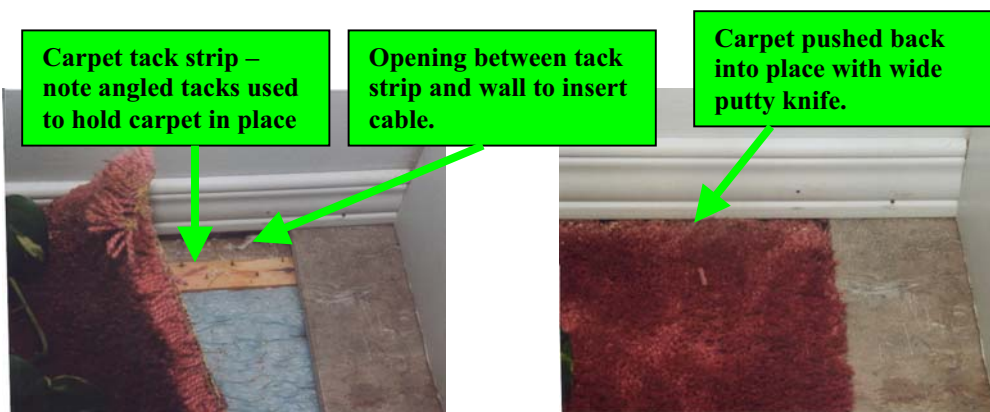


## 8.3 UNDER CARPET CABLE INSTALLATION

Installation of cable underneath the carpet, between the tack strip and the wall is a technique that is somewhat controversial because of several common failure modes associated with it. Care is needed to prevent damage to the cable or to the customer's carpet and structure.

When doing an under-carpet installation, you can usually use a pair of needle-nose pliers to gently pull away the carpet from the wall and expose the space between the tack strip and the wall. Be careful not to pull the carpet off the tack strip itself as a carpet kicker may be required to re-secure the carpet to the tack strip. The cable is placed between the tack strip and the wall under the baseboard, and the carpet pushed back over it and under the baseboard with the aid of a wide putty knife.

**NOTE:** Carpet should not be removed from tack strip, ONLY lifted up from wall. The carpet in the photo below is pulled off tack strip to illustrate the tack strip and opening between tack strip and wall.



## 8.4 THROUGH FLOOR CABLE INSTALLATION

When routing the cable from underneath the floor (basement or crawl space) and up through a carpeted floor, the standard technique is to gently pull the carpet away from the wall with needle-nose pliers. Then, drill a hole through the exposed space between the tack strip and the wall into the lower level (see photo above). As a last resort, if the carpet cannot be pulled away from the wall, punch a pilot hole through the carpet before drilling. This will prevent the carpet fibers from catching and wrapping around the drill bit, which could cause the carpet to unravel.



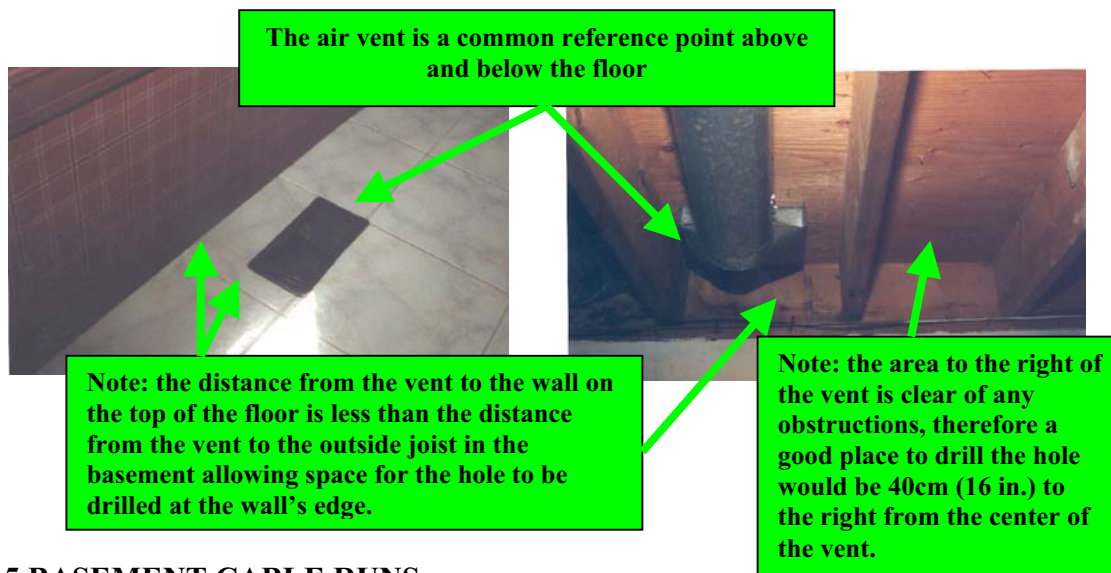
**BEFORE ATTEMPTING ANY UNDER OR THROUGH-CARPET INSTALLATIONS, EXPLAIN TO THE CUSTOMER THE DANGERS INVOLVED AND OBTAIN HIS/HER APPROVAL AND SIGNATURE ON THE WORK ORDER PRIOR TO STARTING**



## 8.4 THROUGH FLOOR CABLE INSTALLATION cont'd

Prior to drilling any holes through the floor, to a basement or crawl space below, care must be exercised to ensure the space, below the floor is free from obstructions such as electrical wiring, gas pipes, water pipes, heating pipes, etc.

Careful measurements from a common point, above and below the floor, will prevent any accidents and assure you of an uneventful installation. Drilling through any obstruction such as a water pipe can cause major damage and expensive repair bills.



## 8.5 BASEMENT CABLE RUNS



The placement of cables in the basement will vary from home to home depending on the condition of the basement and it's finished state. Obviously, finished basements with drywall ceilings will prevent cables from being concealed, therefore an alternate route will have to be selected.



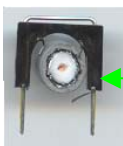
The cable installation in the left side photo is NOT an acceptable installation with the cable and splitter left hanging from the ceiling. If no other route was available the cable should have been secured to the corner of the wall with clips.

## 8.5 BASEMENT CABLE RUNS cont'd

**SECURING CABLE RULES**  
**ONLY SCREWS/CLIPS OR INSULATED STAPLES ON INTERIOR AND ONLY CLIPS/SCREWS ON EXTERIOR**

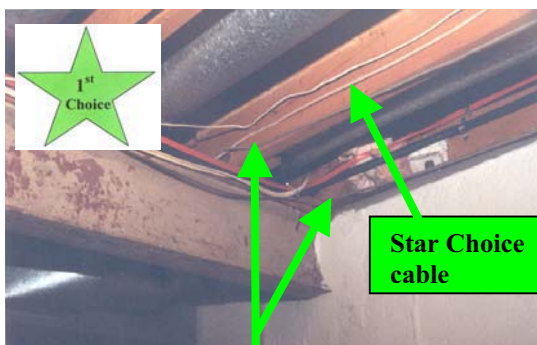
Open basement cable runs should be fairly straightforward, however the following points should be considered or approval obtained from the customer prior to running the cable:

- Are there plans to finish the ceiling? if so,
  - What type will be installed (drywall or false ceiling)
  - This will have an impact on where to run cables
  - False ceilings allow cable to be secured to the bottom of the floor joists
  - Drywall ceilings will require cable holes drilled through joists (minimum 5cm (2 in.) from bottom of joist to prevent drywall nails piercing cable)
- **DO NOT** run cables on long runs adjacent to electrical cables
  - May cause signal interference due to induction from the electrical cable
  - Choose a joist with no electrical runs
- All cables **MUST** be secured at the minimum spacing of 76cm (30 in.) with approved clips/screws or approved staples. If staples are used they should be equipped with shoulder flanges to prevent the cables from being crimped.

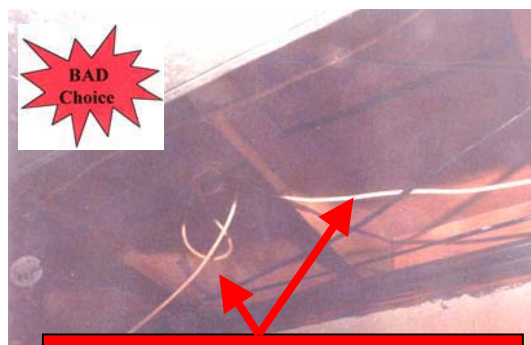


**NOTE: Approved staple prevents cable damage and is quickly installed with an ARROW T59 stapler.**

- If an existing cable is being used to provide Star Choice service, **the cable must be inspected to ensure it meets Star Choice Standards.** If it is not secured properly, then bring up to standard by re-securing cable and clean up any messy cable runs.
- Replace all existing cable connectors.
- Remove all splitters from existing cable runs.



The Star Choice cable is run on an adjacent joist due to electrical runs on the joist closest to the wall and runs 90 degrees when crossing other electrical cables.



**UNACCEPTABLE**  
 The existing cable run is carrying Star Choice service and was left wrapped around an electrical cable.



**CAREFULLY PLACING CABLE RUNS WILL ENSURE LONG LASTING AND TROUBLE FREE SERVICE TO STAR CHOICE CUSTOMERS.**



## **INSTALLATION HANDBOOK**

### **9.0**

#### **TELCO CONNECTION FOR IPPV SERVICES**



## 9.1 DESCRIPTION

Star Choice digital satellite receivers are equipped with an internal modem for the purpose of communication between the customer's in-home digital satellite receiver and Star Choice's Head-end facility. When the digital satellite receiver is connected to a telco line it allows for Instant-Pay-Per-View (IPPV) purchases by the customer for Pay-Per-View events and also allows for the processing of charges for the Pay-Per-View (PPV) services provided by Star Choice Communications Inc. The digital satellite receiver must be connected to the customer's active telephone service via a telco cord equipped with modular RJ-11 jacks between the digital satellite receiver's RJ-11 telco connection on the back of the digital satellite receiver to an existing or newly installed telco jack.

Once connected and active, the customer can now order IPPV Services directly from the remote control without having to call Star Choice Communications Inc. to activate any PPV Services.

In most cases, there is usually an existing telco jack within a 7.6m (25 ft.) vicinity of the digital satellite receiver. This only requires the installation of a telco "T" adapter into the existing telco jack allowing both the digital satellite receiver and the existing telephone to be functional from an existing single telco jack. The telco "T" adaptor and the 7.6m (25 ft.) telco cord is usually supplied and packed in the same container as the satellite receiver.

In cases where an existing telco jack is not within 7.6m (25 ft.) or it is not suitable or safe to leave a telco cord plugged in, the recommended alternative is to install a wireless telco jack.



### **ENSURE THE FOLLOWING GUIDELINES ARE ADHERED TO:**

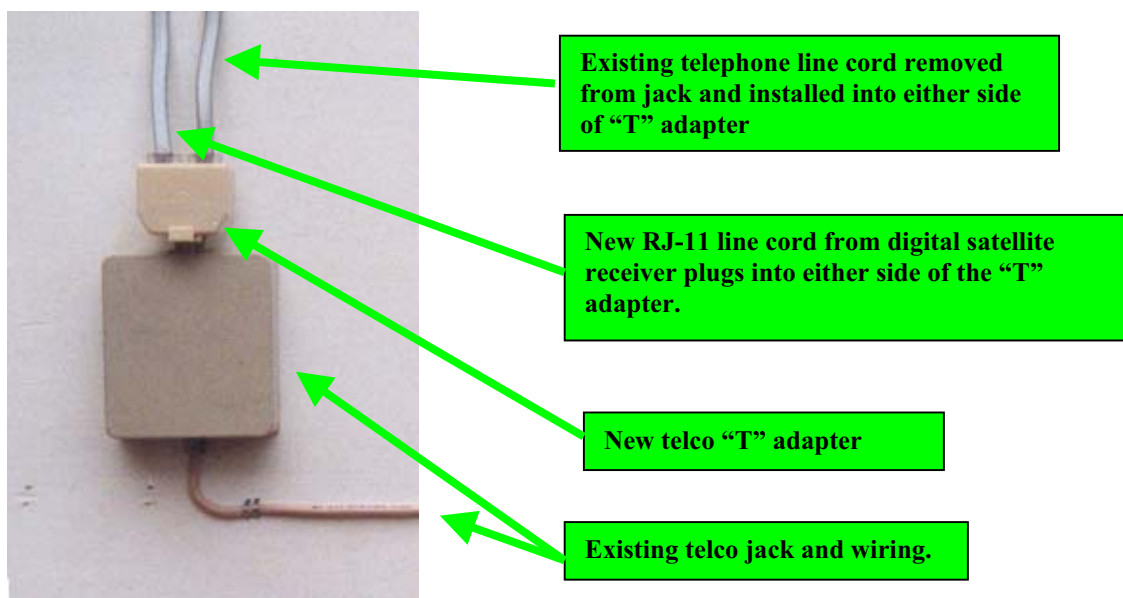
- The satellite receiver is connected **only** to the customer's telephone line that is registered with Star Choice Communications Inc.
- Always verify the existing telephone is in working order prior to disconnecting, to add the "T" adapter or adding new wiring and a new jack.
- When the satellite receiver is connected to the telephone line **always** check to ensure the telephone is left in working order. **DO NOT** connect the digital satellite receiver to Multi-party telephone services as this is illegal and the customer could have their telephone service disconnected, as it will affect other telephone customers connected to the same line.

## 9.1 DESCRIPTION cont'd

- **DO NOT** connect the digital satellite receiver to small business or commercial systems that have over 2 lines. In most cases, the telephone line from the jack will terminate on a central telephone equipment system that contains a data channel connection between the jack and the central system. In these systems, the digital satellite receiver's **modem or the wireless telco jack is not compatible with the telephone line.**
- Be very careful when working on customer's telephone wiring, as in today's environment there are many telephone customers that **now have 2<sup>nd</sup> lines for fax machines, computer Internet services and/or alarm systems.** In most residential cases, the 2<sup>nd</sup> line will utilize the 2<sup>nd</sup> pair of wires in the same telephone-wiring run. Care must be exercised to ensure the 2<sup>nd</sup> line or the alarm system is not disturbed.
- With recent CRTC rulings, the customer now owns and is responsible for the inside telephone wiring back to the Telephone company's "demarcation point" which is usually located externally or internally at the telephone cable entrance point to the home.

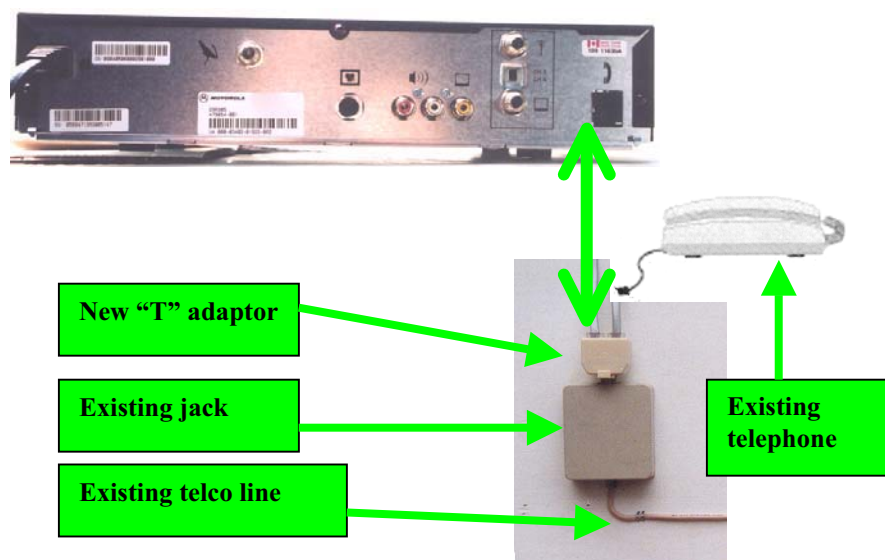
## 9.2 DIGITAL SATELLITE RECEIVER TELCO CONNECTION

In most cases, the digital satellite receiver can be connected to the customer's active telephone service using an existing telco jack. The simple addition of a telco "T" adapter to the existing telco jack will allow both the telephone and the digital satellite receiver to function from a single, existing telco jack. Ensure you test the telephone prior to disconnecting the line cord from the jack and verify it is working after the "T" adapter and the digital satellite receiver has been installed and the telephone reconnected.





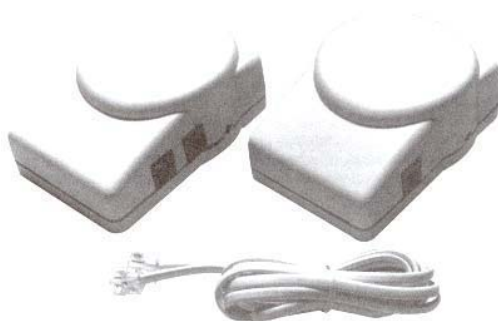
## 9.2 DIGITAL SATELLITE RECEIVER TELCO CONNECTION



THE CUSTOMER NOW PAYS TO HAVE THEIR TELEPHONE SERVICE REPAIRED IF THE CAUSE IS WITHIN THE HOME (CUSTOMER SIDE OF THE DEMARCATION POINT) THEREFORE IT IS CRITICAL THAT THE TELEPHONE SERVICE IS VERIFIED TO BE WORKING PRIOR TO YOUR DEPARTURE.

## 9.3 INSTALLATION OF THE WIRELESS TELCO JACK

There will be cases where an existing telco jack is not within reach of the 7.6m (25 ft.) telco line cord or the jack is not accessible due to doorways, furniture obstructions, etc. In these cases, a wireless telco jack installation will be required.



The wireless telco jack comes with a transmitter Base unit, receiver Extension unit and a 1.8m (6 ft.) telco cord equipped with RJ11 jacks on each end. A "T" adaptor is not required as the Base unit is equipped with 2 jacks:

- One for the existing telephone
- One for the Base unit to be plugged into the existing jack.

### The wireless telco jack features:

- Operates on a low frequency of 3.3 & 8.2 MHz over the home AC wiring.
- Up to eight (8) Extension units have been successfully tested with one (1) Base.
- It has been successfully tested at a distance of 305 wired metres (1,000 ft.).
- Has been successfully tested to operate at a baud rate in the mid 30K range.

## 9.3 INSTALLATION OF THE WIRELESS TELCO JACK cont'd



**ENSURE ALL THE GUIDELINES DOCUMENTED IN SECTION 9.1 ARE ADHERED TO.**

### **PROCEDURE:**

**STEP 1:** Ensure the existing telephone is working and is the correct telephone number that belongs to the customer that is registered with Star Choice Communications Inc.

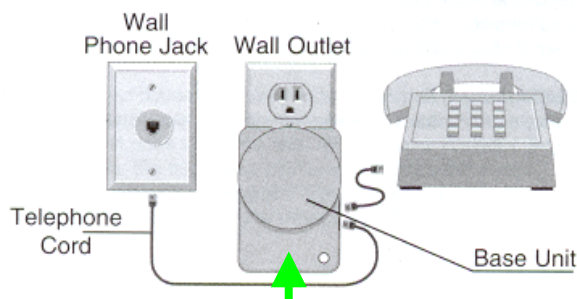
**STEP 2:** Plug the Base unit into an AC outlet near the existing telco jack (within 6').

**NOTE:** There does NOT have to be an existing telephone using the jack, however if this is the case, the jack must be verified that it is connected to the customer's telephone line and is working. This can be tested with a telephone tester or by using one of the customer's telephone sets and plugging it into the jack. At this point if there is dial tone you may wish to verify that it is the correct telephone number by calling the customer's telephone number with a cell phone or have someone call you.

**STEP 3:** Unplug the customer's telephone from the jack and plug the Base unit's 6' telco cord provided, into the existing jack and one of the jacks on the Base unit.

**STEP 4:** Plug the customer's telephone into the alternate jack on the Base unit and verify that dial tone exists by listening for dial tone with the customer's telephone.

### COMPLETED "BASE UNIT" INSTALLATION



The "base unit" has two jacks on the side.

- One for the existing telephone
- One for the 1.8m (6 ft.) telco cord from the existing jack.

## 9.3 INSTALLATION OF THE WIRELESS TELCO JACK cont'd

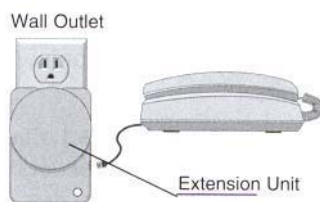
### **PROCEDURE cont'd:**

**STEP 5:** Plug the Extension unit into an AC outlet near the digital satellite receiver.

**STEP 6:** At this point the Extension unit should have dial tone that can be verified by using the customer's telephone and plugging in into the Extension unit and listening for dial tone. If dial tone is present proceed with the STEP 6, if dial tone is not present go to STEP 7.

**STEP 6:** If dial tone is present, unplug the customer's telephone and return it to its original location. Plug the telco cord provided with the digital satellite receiver into the Extension unit and into the telco jack on the rear of the digital satellite receiver.

### COMPLETED "EXTENSION UNIT" INSTALLATION



### **AT THIS POINT THE DIGITAL SATELLITE RECEIVER IS IPPV READY**

**NOTE:** In multiple dwelling complexes the Extension unit can be tested to ensure it is receiving the correct telephone number by unplugging the Base unit and dial tone on the Extension unit should disappear.

**STEP 7:** Should dial tone NOT be present verify that dial tone is present at the Base unit and both the Base and Extension units have power from the AC outlet. The units come from the factory preset to a default security code that may have to be reset. To reset the wireless telco jack system proceed to STEP 8.

**STEP 8:** Using a small pointed object (pen/pencil), press the recessed button on the Base unit. The green light on the base unit will come on and **remain on for 5 minutes** allowing you time to go to and program the Extension unit(s).

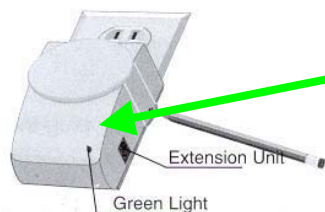
### **PROGRAMMING THE BASE UNIT**



## 9.3 INSTALLATION OF THE WIRELESS TELCO JACK cont'd

**STEP 9:** Within 5 minutes of activating the program mode on the Base unit go to the Extension unit(s) and press the recessed button. The Extension unit green light will flash once indicating that it has programmed itself to the Base unit. If the Extension unit green light flashes repeatedly, the Base unit is either NOT in the security programming mode (green light on Base unit is not illuminated) or the Extension unit is too far from the Base unit.

### PROGRAMMING THE BASE UNIT



**GREEN LIGHT SHOULD FLASH ONCE AND GO OUT.**

### 9.3.1 TROUBLESHOOTING THE WIRELESS TELCO JACK SYSTEM

If proper installation has occurred and it does not operate effectively, the following five (5) items should be followed to determine any possible problems:

- Double check to make sure that the Base unit and Extension unit are completely plugged in.
- Ensure the telephone outlet is operational where the Base unit is located.
- Verify dial tone at the Extension unit...if there is no dial tone try moving either the Base, Extension unit or both to other locations.
- Reprogram units in different outlets and then move them to the desired locations.
- Replace the unit(s) with new ones to determine if either unit is defective.

If there is static in the line that may be preventing the units from operating effectively, follow the two (2) steps below.

- Move Base/Extension units, starting with the Base, to other locations within the home.
- Move Base/Extension units away from halogen lamps, dimmer switches, fluorescent lights, and surge suppressors including GFI outlets.



#### **DO NOT:**

- Plug units into surge suppressor or power bar.
- Plug units into a Ground Fault Interrupter (GFI) outlet.
- Install more than one (1) Base unit per home.
- **When installed into an apartment or any home sharing a common wall or electrical system ensure the security code is reprogrammed.**



# *System Grounding*

Issued 5/12/02



## **INSTALLATION HANDBOOK**

### **10.0**

#### **GROUNDING GUIDELINES FOR THE STAR CHOICE SYSTEM**



## 10.1 Grounding Policy

Grounding is an essential Safety related part for all Star Choice installations. Star Choice Communications requires that all systems installed, be grounded to meet the current safety standards.

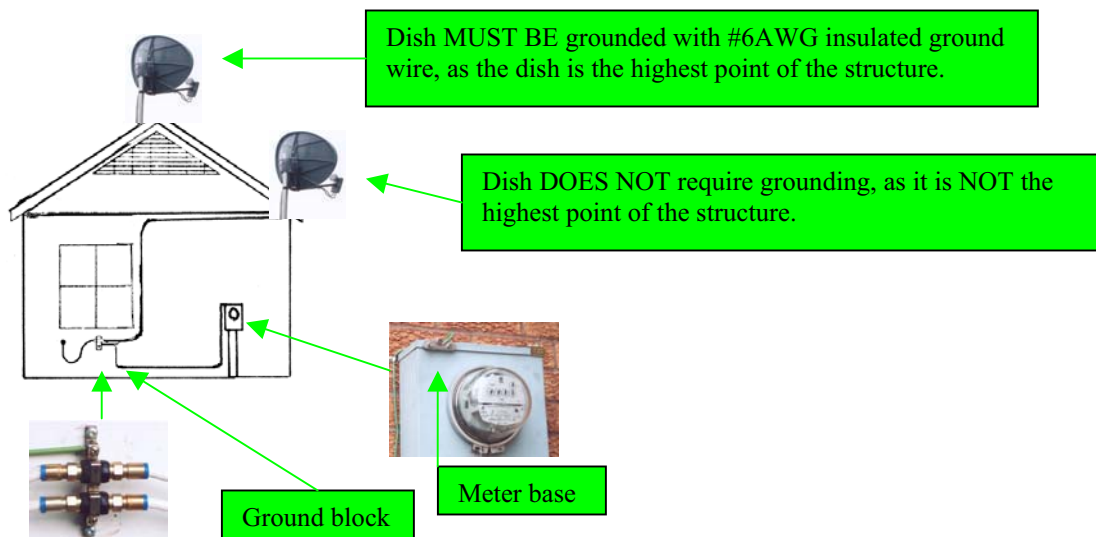
The grounding must be done in compliance with Local and National Electrical Codes. The Canadian Electric Code will normally be used unless the Local Code is stricter in its requirements. In this case, the Local requirements will be used.

**Grounding will be installed as follows:**

- All systems will have the coaxial download(s) grounded with a grounding block as close as possible to the grounding source.
- In most cases, dishes do not require grounding. The following two exceptions will require the dish to be grounded as well as the coaxial download.
  1. When the dish is mounted on the roof and becomes the highest point on the structure.
  2. When the dish is ground mounted on a pole in an open area (away from the home due to line-of-sight issues) such as a field. The ground wire **MUST** be run back to the home for grounding (NO ground rods) to ensure there are no ground potentials created. Using ground rods at the dish location and structure grounding for the coaxial download may create ground potential between the two grounding points.

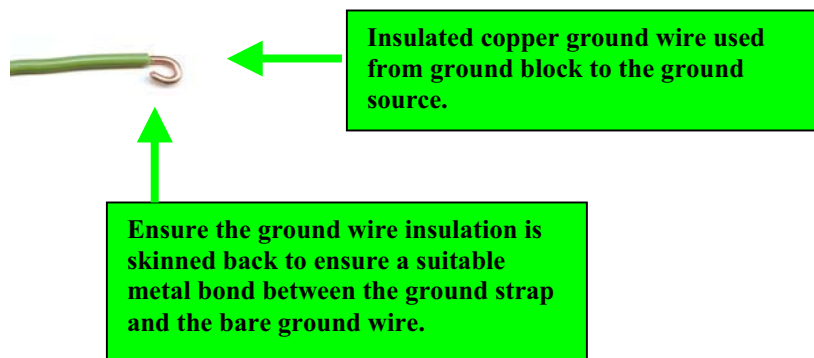
**Grounding locations in order of preference, from most desirable to least desirable:**

1. Power utility ground (the bare ground wire grounding the electrical panel)
2. Electrically conductive cold water pipe.
3. Electrical service equipment such as the hydro stack or meter base.
4. **DO NOT** use ground rods (new or existing).



## 10.2 The Ground Wires

The ground wire from the ground block to the selected grounding device must be capable of carrying the rated current of the outer conductor of the coaxial cable it is protecting, furnishing a conductive path of sufficiently low impedance. Coaxial downlead installations, using RG6 requires, as a minimum, an insulated, copper ground wire of a size specified in Exhibit 10.1 (below) from the ground block to the ground source. All downlead coaxial cables from the dish will require grounding.



**EXHIBIT 10.1**

### MINIMUM SIZE AND MAXIMUM LENGTH OF GROUND WIRE

DROP WIRE		GROUND WIRE	
Type	Shield	Length	Size
RG6	Aluminum foil and 60% Aluminum braid	No more than 50% of the drop length	#12 AWG
		Above 50%, but not longer than drop	#10 AWG
RG6 Siamese or two RG6 cables on dual ground block	Aluminum foil and 60% Aluminum braid	No more than 50% of the drop length	#10 AWG
		Above 50% but not longer than drop	#8 AWG

# System Grounding

Issued 5/12/02

## 10.3 Ground Wire Installation

Install the ground block and make the grounding connection to the downlead coaxial cable as close to the grounding point as possible. Attach the ground wire to the downlead coaxial cable by the use of an approved ground block device. **Ensure the proper ground strap is used to prevent oxidization between ground strap and grounding source: “copper to copper or galvanized to galvanized”**

- Copper ground strap for copper pipes



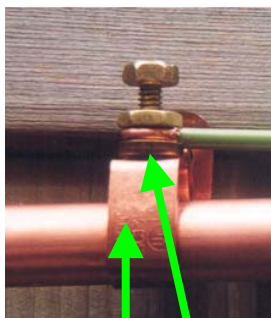
- Galvanized ground strap for galvanized metal pipes such as hydro stacks, etc.



- Galvanized steel meter pan connector for meter base grounding.



- Ground connector used to connect #4 or #6 electrical bond ground to #10/12/14 ground wire.



Copper ground strap on copper pipe and ground wire insulation is skinned back.



Approved ground block securely fastened with screws/anchors into mortar joints and ground wire insulation skinned back.



Ground wire installed on electrical meter base with approved meter base clamp.

## 10.4 Ground Wire Guidelines

Run the ground wire as straight as possible to the ground point, following mortar grooves or joints in siding. Attach it to the building exterior every 50 cm (20 in.) with appropriate clips (for vinyl or metallic siding) or suitable straps. Remove all paint and other insulation from the bonding attachment point of the grounding prior to installing the ground clamp or strap. Use only approved ground wires, with thermoplastic insulation of appropriate colour, (green or black) which protects it from the possibility of physical damage and **ensure ground wire insulation is skinned back prior to attaching ground wire to grounding device.**

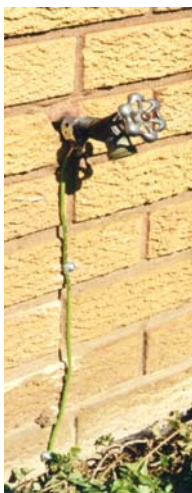
The following grounding locations are listed in order, from most desirable to least desirable.

1. Power Utility ground conductor, the bare ground wire used for grounding the electrical panel. (See picture to the right)

Power Utility ground  
conductor #6 AWG  
copper

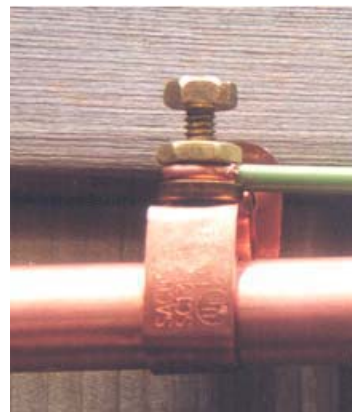


2. Electrically conductive cold water pipe grounding electrode (structure grounding electrode system). If the grounding wire cannot be connected before the water meter, ensure the continuity of the ground by a bond of at least #6 AWG wire across the meter or other insulating section. Space bonding point's 30 cm (12 in.) from the meter on both sides to avoid damages caused by future service of the water feeding system.



### NOTE:

Some domestic cold water systems do not comply with the ground electrode requirement. If a ground wire does not exist between the utility electrical box and the water pipe, the installation technician must assume that no complete grounding electrode system exists. In this case, use an alternative.



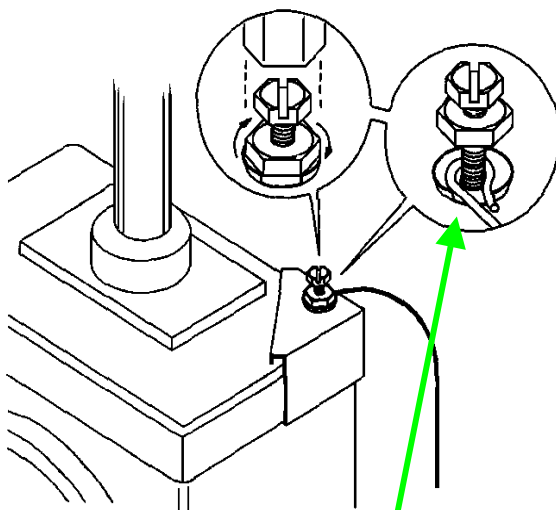
# System Grounding

Issued 5/12/02

## 10.4 Ground Wire Guidelines cont'd

3. Service equipment enclosure, or continuous metal conduit (e.g. metal power stack or meter base). This is the preferred method of obtaining a ground in areas where a complete grounding electrode system cannot be guaranteed.

### Meter Base grounding clamps.

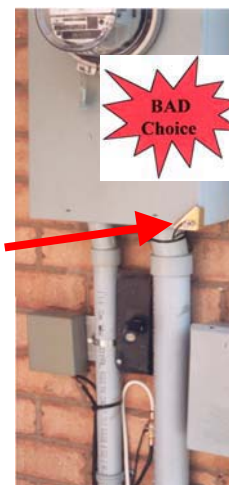


Keep Ground wire inside cupped washer



The first choice location for this connection is the top rear corner of the meter when possible or second choice is the top front corner.

**Under no circumstances shall the ground clamp be installed on the bottom corners as it prevents the utility company from opening the meter base.**



4. In pre-wired residences the choice of grounding electrode will have been made and the ground wire placed as part of the pre-wire activity. Use the pre-wired grounding wire to ground at cable entry. Ensure that the grounding wire is bonded to the house ground. If the grounding wire is missing, choose a grounding location and complete the grounding procedure as outlined above.



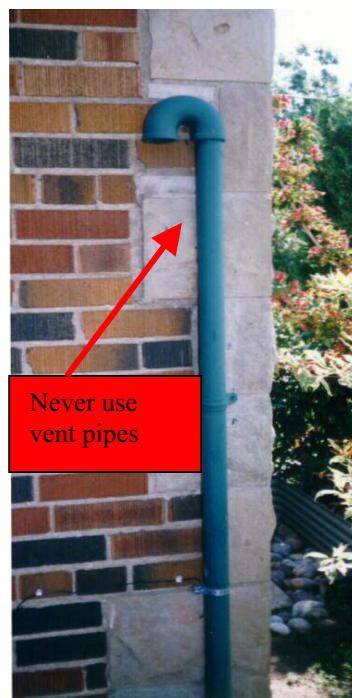
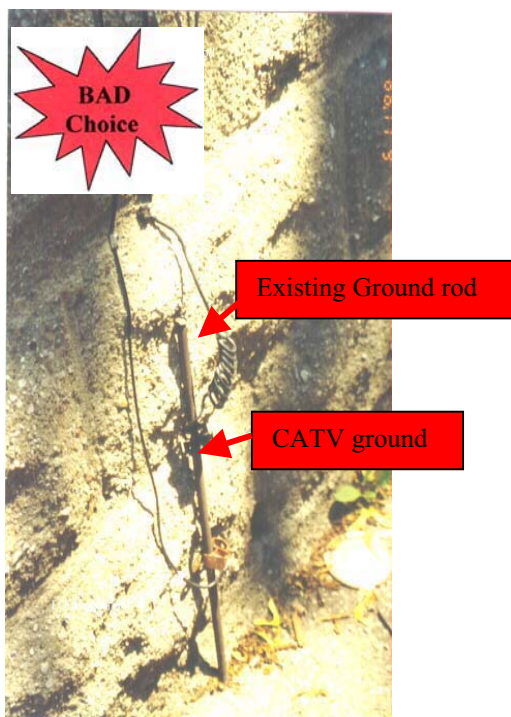
## 10.4 Ground Wire Guidelines cont'd

Star Choice does NOT accept the use of ground rods at customer locations.

- Artificial electrodes, such as driven ground rods, are NOT acceptable for obtaining a ground. It is preferable for the downlead coaxial cable to enter close to and be connected directly to the power utility's ground conductor as presented in previous guidelines #1 to #3.
- Ground rods may cause potential differences at the digital satellite receiver due to the two grounding sources presented on the coaxial ground and the satellite receiver chassis ground provided by the AC grounding system.
- Ground rods may cause damage if cable, gas line or buried hydro locates are not done prior to driving in ground rods.
- Ground rods may cause safety related problems when not properly installed and concealed.

### **\* Avoid Ground Rods\***

**NEVER USE** Steam, Gas, Vent or Hot water pipes as a location to ground Star Choice systems.



**1st DRAFT**



## **INSTALLATION HANDBOOK**

### **11.0**

#### **SYSTEM DISCONNECT PROCEDURES**



## 11.1 DISCONNECTS – GENERAL

Before the installer removes any equipment from the premises, the installer must first make contact with the customer and inform them of the disconnect order and request permission to enter the property to remove the equipment listed on the work order. **Before disconnecting** the customer, the technician shall determine the reason for the customer disconnecting, and if for service related problems, **determine if those problems can be resolved and persuade the customer to keep the service.** If the disconnect is not service related and the customer still wishes to disconnect, continue with the disconnection and removal of equipment.

### **“Disconnects will not be completed without a written work order”**

The equipment identified on the work order must be collected at the time of the disconnection. Depending on the type of disconnection, (refer to disconnect types below) the dish, mounting hardware and coaxial cable may need to be removed.

A copy of the work order must be properly completed, including equipment serial numbers and signed legibly by the installer and customer. One copy of the work order will be left with the customer verifying that equipment has been returned to Star Choice. Any apparent damage to the equipment must be noted on the work order and brought to the customer's attention, the customer may be invoiced for the repairs.

Any equipment not collected at the time of disconnect will be invoiced to the disconnecting customer. The customer must be informed of this, at time of disconnect.

### **REFER TO SECTION 16.0 – DOCUMENTATION, FOR DETAILS AND EXAMPLES ON SYSTEM DISCONNECTS**

There are three types of disconnects,

1. **Simple Disconnect (Receiver Only):** Star Choice prefers to leave the dish, mount and cabling in place, and tag the home as “Star Choice Ready”. The Star Choice satellite receiver(s) and remote control(s) equipment will be collected and a Work Order receipt for the equipment is left with the disconnecting customer. The dish, mount and external cable will be left in place for the next Homeowner and the disconnected equipment will be tagged and returned to Star Choice.
2. **Partial Disconnect (Receiver and Dish Only):** The customer no longer requiring Star Choice service will have the satellite receiver(s) and remote control(s) removed. At the customer's request the dish will also be removed.
3. **Full Disconnect (Receiver, Dish and Exterior Cables):** The customer no longer requiring the Star Choice service will have the satellite receiver(s) and remote control(s) removed. At the customer's request the dish and exterior cables will also be removed.



## **11.2 SIMPLE DISCONNECT**

Your first task on a disconnect work order is to consult the customer for the reason they are terminating their Star Choice service. Be polite, professional and give the customer a feeling that you are concerned.

If the disconnect work order was issued due to the customer moving, proceed with the “Simple Disconnect” and remove the satellite receiver(s) and the remote control(s). Complete the paperwork per “Section 16.0 – Documentation” and leave a copy with the customer. The signed work order will serve as the customer’s receipt that the equipment listed on the work order was taken by Star Choice. Ensure the customer signs the work order. If any of the equipment listed on the work order cannot be recovered advise the customer that they will be invoiced for the missing equipment.

If the disconnect work order was issued due to service related problems or other reasons such as “customer user” issues, explain to the customer that you are prepared, at this time, to investigate and repair any service related issues or spend time to educate the customer with any user problems they may experience. Should the customer still request the system to be disconnected, proceed after discussing the disconnection options. Discuss the disconnection options with customer and explain the benefits of a “Simple Disconnect”.

Star Choice prefers to leave the dish, mount and cabling in place, and tag the home as “Star Choice Ready” however, should the customer prefer to proceed with a Partial or Complete disconnect then follow the applicable disconnect procedure.

## **11.3 PARTIAL DISCONNECT**

Again, your first task on a disconnect work order is to consult the customer for the reason they are terminating their Star Choice service. By this time, it has been decided to complete a Partial Disconnect that consists of removing the satellite receiver(s), remote control(s) and the dish. Explain the options for dish removal to the customer - dish and mount or dish only. Depending on the location of the dish, the removal process will vary. Wall mounts are easily removed, however roof mounts on shingled roofs are more complex and the procedure should be well explained to the customer. Explain to the customer that there are two methods of dish removal on shingled roofs and they are:

1. Dish and mast only - leaving the mount foot secured to the roof and,
2. Complete dish/mount removal that will require re-sealing the roof.

Once an agreement on the removal process has been reached, follow the procedures under the applicable sub-section:

- 11.5 Wall Mount Removal
- 11.6 Roof Mount Removal

## **11.4 FULL DISCONNECT**

Again, your first task on a disconnect work order is to consult the customer for the reason they are terminating their Star Choice service. By this time, it has been decided to perform a Complete Disconnect that consists of removing the satellite receiver(s), remote control(s), dish and external wiring.

Once an agreement on the removal process has been reached, follow the procedures under the applicable sub-section:

- 11.5 Wall Mount Removal
- 11.6 Roof Mount Removal
- 11.7 Wiring Removal

## **11.5 WALL MOUNT REMOVAL**

Where dishes have been mounted on a vertical wall, both the dish and mount will be removed. Once the mount is removed, the plastic anchors or bolt anchors will be removed and the holes sealed with clear hardening silicon or approved sealant to match the colour of the wall.

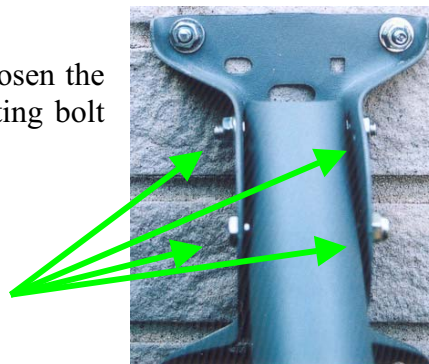
- When removing a dish and mount from wood, remove the lag screws and seal the hole with clear hardening silicone.
- When removing a dish and mount from concrete or brick the process is more complex, as in some cases it may be difficult or impossible to remove the bolt anchors. To remove a dish and mount follow the procedure below:

### **Dish/Mount removal from concrete/brick:**

#### **STEP 1**

- Remove the dish from the mount and loosen the mount mast to gain access to the mounting bolt anchors.

**LOOSEN THE 4 MAST BOLTS FROM THE MOUNT FOOT TO GAIN ACCESS TO THE BOLT ANCHORS.**





## 11.5 WALL MOUNT REMOVAL cont'd

**MAST REMOVED  
AND BOLT  
ANCHORS EXPOSED.**



### STEP 2

- Put nuts back on the anchor bolt. DO NOT screw too far as to expose bolt threads while leaving approx ½ " between nut and wall.

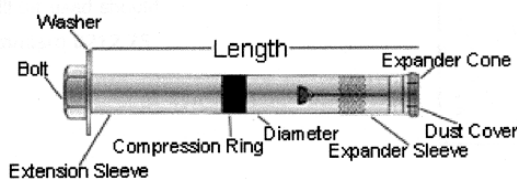


### STEP 3

- Slightly tap the nut/anchor with a hammer to decompress the wedge anchor. It may be impossible to remove the wedge anchor without decompressing the expander sleeve and cone.



**ANCHOR BOLT DESIGN**



**COMPRESSED ANCHOR EXPANDER  
SLEEVE COMPRESSED TO SECURE  
MOUNT INTO HOLE – ALSO PREVENTS  
REMOVAL**

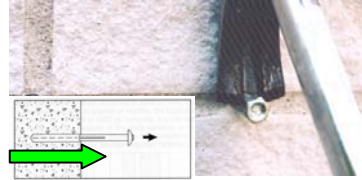


**TAPPING THE BOLT WILL  
DECOMPRESS THE ANCHOR  
SLEEVE ALLOWING FOR EASIER  
REMOVAL.**

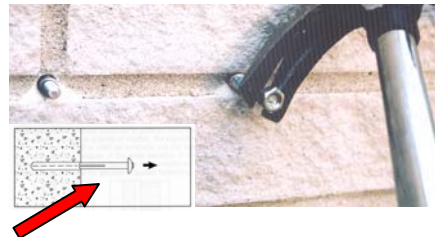
## 11.5 WALL MOUNT REMOVAL cont'd

### STEP 4

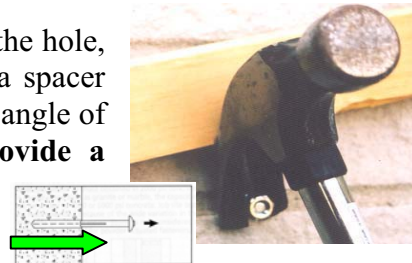
- Once the anchor has been decompressed, use a claw hammer to pull the anchor out as far as possible.



- Care must be taken when applying pressure, as the further the anchor is pulled out, the hammer will start applying a sideways pressure due to the roundness of the back of the hammer and the angle of the claw. This will cause the anchor to wedge itself against the sides of the hole.



- Once the anchor starts to wedge itself against the hole, due to the angle of the pull, stop and insert a spacer under the hammer. The spacer will change the angle of the pulling pressure on the anchor and **provide a straight pulling pressure.**



### STEP 5

- Once the anchors have been removed clean the excess dust/material around the hole to prepare for sealing.



### STEP 6

- Seal each hole with clear hardening Silicone. This will prevent water from entering the face of the brick, which may freeze and cause the face of the brick to break off. It will also camouflage the holes. **Care must be taken not to smear the Silicone across the face of the brick**



SEALER ON BRICK FACE

- MORE CARE REQUIRED  
WHEN APPLYING SEALER

SEALER NEATLY  
APPLIED

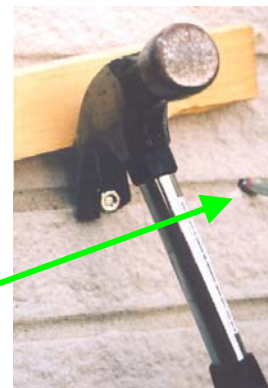
## 11.5 WALL MOUNT REMOVAL cont'd

### STEP 7

If the anchor cannot be completely removed, as shown on the far right, it must be cut off with a hacksaw. Once the exposed portion of the anchor has been cut off, use a hammer and punch to tap the anchor back into the hole as far as possible to allow for the application of the sealer.

**ANCHOR COULD NOT BE COMPLETELY REMOVED.**

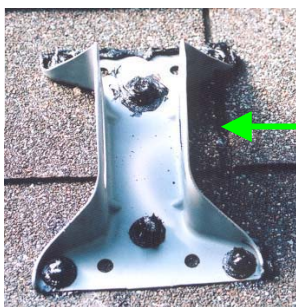
**CUT OFF EXPOSED PORTION WITH A HACKSAW AND TAP BACK INTO HOLE THEN APPLY SEALER.**



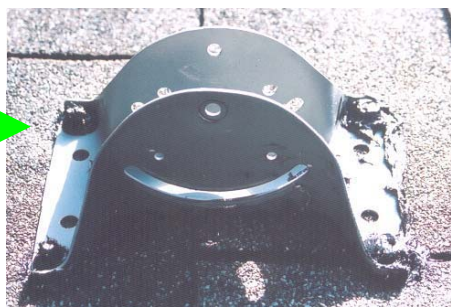
## 11.6 ROOF MOUNT REMOVAL

When doing a dish removal advise the customer that the recommended procedure is to leave the mount foot on the roof. Advise the customer that it was professionally sealed and to remove the mount may cause damage to the shingles.

### Recommended Option:



**MAST REMOVED AND  
MOUNT FOOT LEFT IN  
PLACE RESULTING IN  
AN UNDISTURBED  
SEAL**



Make note on the Work Order that mount foot was left in place at the customer's request. Have the customer sign-off on the Work order and leave a copy of the Work Order with the customer

**Should there be any difficulty in the removal of the mount or complications with the customer, notify the Star Choice supervisor immediately to determine the best resolution.**

## 11.6 ROOF MOUNT REMOVAL cont'd

### Mount Removal Options:

Should the customer request the mount foot to be removed, advise the customer of the **two procedures**. To assist in your explanation, you may wish to show the customer some of the following photos. Also, advise the customer that Star Choice cannot be held liable for damaged shingles as it is impossible to remove the mount foot without leaving roof repair marks on the shingles. Advise the customer that the repair marks may be visible, especially on light colored shingles.

There are two methods to reseal the roof once the mast foot has been removed. Both methods are acceptable however the decision on the method used will depend on the colour and condition of the shingles. The two methods are:

- Remove the mount foot and re-insert lag screws and reseal (recommended method).
- Remove lag screws, lift the shingle(s) and seal from the underside of shingle (alternate method).

Should the customer wish to continue with the complete removal, have the customer sign the work order acknowledging that the shingles cannot be left without visible repair marks.

### Foot removal procedure:

#### STEP 1

- Remove the lag screws from the mount foot being careful not to pull on the mount, as it will lift the shingles and may cause them to crack, especially if they are old and brittle.



#### STEP 2

- Once the lag screws have been removed, carefully pry up the mount using a putty knife to separate the mount foot from the shingles.



Putty knife inserted between the foot and the shingle.



Apply gentle lifting pressure on the mast while twisting the putty knife until the mount is separated from the shingles and is removed.



## 11.6 ROOF MOUNT REMOVAL cont'd

### STEP 3

- Once the mount foot has been removed **DO NOT** attempt to remove the excess roofing sealer as it may damage the surface of the shingles.

**DO NOT attempt to remove the excess roof sealer.**



### 11.6.1 ROOF RESEALING

#### Recommended method - Remove mount foot and re-insert lag screws and reseal

### STEP 1

- Once the foot is removed as covered in 11.7 - Steps 1 to 3, refill the screw holes with roofing tar and replace the lag screws in the holes. Tighten the lag screws down flush to the shingles.



### STEP 2



- Reseal over the lag screw heads with the roofing sealant.



### STEP 3

- Advise the Homeowner of the repair and make note on the Work Order that mount foot was removed at customer's request. Note the method of removal on the Work Order and have the customer sign-off and leave a copy of the Work Order with the customer.

### STEP 4

- Seal the end of the sealer dispenser with a short lag screw to prevent the dispensing tube from becoming blocked with hardened sealer.



**LAG SCREW**

**Should there be any difficulty in the removal of the mount or complications with the customer, notify the Star Choice Supervisor immediately to determine the best resolution.**



## 11.6.1 ROOF RESEALING cont'd

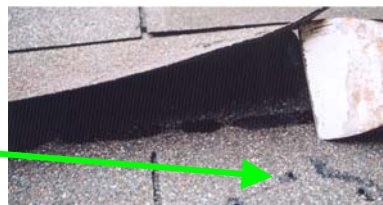
**Alternate method** - Remove lag screws, lift the shingle(s) and seal from the underside of the shingle(s).

- Should the shingles be light in colour and they are NOT brittle, an alternate method can be used that will not show the re-sealing work as in the previous method.

### STEP 1

- Using a putty knife carefully lift the shingle and prop up to expose the lag screw holes under the shingles.

**LAG SCREW HOLES EXPOSED**



### STEP 2

- Apply the roofing sealant over each of the holes under the shingle.

**LAG SCREW HOLES COVERED WITH ROOFING SEALER**



### STEP 3

- Apply a strip of roofing sealant along the edge of the shingle to replace the original sealer that was used to prevent the shingle from being lifted by the wind.

**NEW SEALEANT APPLIED TO HOLD DOWN**



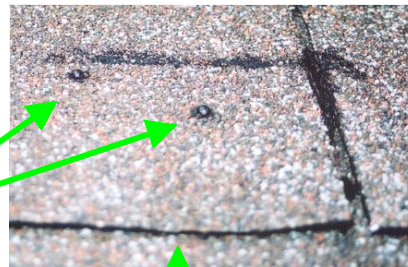
**ORIGINAL SEALANT USED TO HOLD DOWN SHINGLE**

## 11.6.1 ROOF RESEALING cont'd

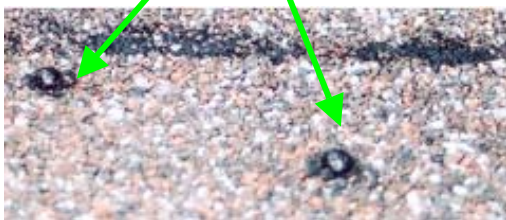
### STEP 4

- Compress the shingle applying pressure around the old lag screw holes and along the edge of the shingle to re-secure the shingle.

LAG SCREW HOLES SEALED FROM UNDER THE SHINGLE. THE SEALANT HAS PROTRUDED UP THROUGH THE HOLE AS VISIBLE FROM THE SMALL SEALANT BALLS ON THE SURFACE.



SHINGLE EDGE RE-SECURED TO LOWER SHINGLE



The “recommended method” of repair is more visible than the “alternate method”, however both methods provide an acceptable weatherproofing seal. CAUTION must be exercised when applying the “alternate method” due to the danger of cracking older and brittle shingles.

ALTERNATE METHOD



RECOMMENDED METHOD



### STEP 5

- Advise the homeowner of the repair and make note on the Work Order that mount foot was removed at customer's request. Note the method of removal on the Work Order and have the customer sign-off and leave a copy of the Work Order with the customer

**Should there be any difficulty in the removal of the mount or complications with the customer, notify the Star Choice Supervisor immediately to determine the best resolution.**

## 11.7 WIRING REMOVAL

### STEP 1

- If requested by the Homeowner remove all **external** Star Choice wiring, clips and anchors (if applicable) from the outside of the home. Terminate the ends of the coaxial cables that remain.

REMOVE ALL EXTERIOR  
CABLE INCLUDING WIRE  
CLIPS AND SCREWS.



**DO NOT cut or remove wiring from the interior of the home** unless requested by the Homeowner. Make note on the Work Order if you are requested to remove any interior wiring and have the Homeowner sign off. The interior wiring in the home is the property of the Homeowner. Terminate coaxial cables at a convenient location close to the entry point, as this will make it easier to reconnect the residence in the future.

### STEP 2

- Remove the plastic anchor by threading the screw partially back into the anchor and pulling the anchor out. The colour of the plastic anchor will stand out against the colour of the wall if not removed.

ENSURE PLASTIC ANCHORS ARE  
REMOVED PRIOR TO SEALING SCREW  
HOLE WITH CLEAR SILICONE



### STEP 3

- Seal each hole with clear hardening Silicone. This will prevent water from entering the face of the brick, which may freeze and cause the face of the brick to break off. It will also camouflage the holes. **Care must be taken** not to smear the Silicone across the face of the brick



**Should there be any difficulty in the removal of the exterior wiring or complications with the customer, notify the Star Choice Supervisor immediately to determine the best resolution.**



# ***Troubleshooting Tips/Procedures***

Issued 5/12/02



## **INSTALLATION HANDBOOK**

### **12.0**

#### **TROUBLESHOOTING TIPS FOR STAR CHOICE SYSTEMS**

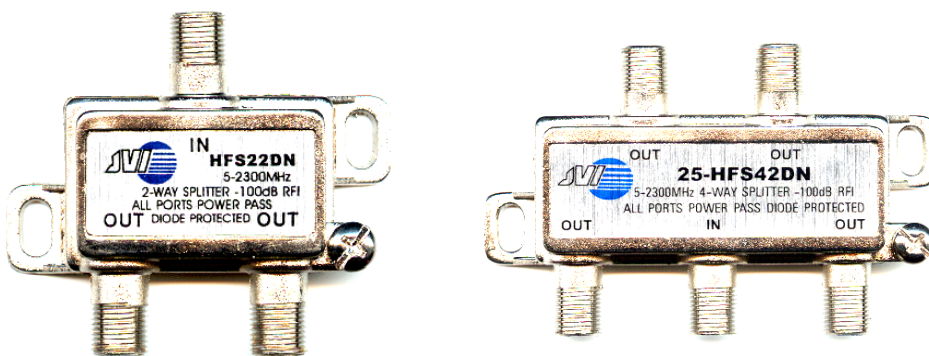
# Troubleshooting Tips/Procedures

Issued 5/12/02

## 12.1 GENERAL

**THIS SECTION IS RESERVED FOR THE DISTRIBUTION AND FILING OF  
TROUBLESHOOTING TIPS AND PROCEDURES.**

**THESE TIPS AND PROCEDURES WILL BE DISTRIBUTED ON AN “AS  
REQUIRED BASIS” AS THEY ARE IDENTIFIED.**







# ***Customer Education and Home Set-Up***

Reviset 22-07-03



## **INSTALLATION HANDBOOK**

### **13.0**

#### **CUSTOMER EDUCATION PROCEDURES AND SET-UP OF THE CUSTOMER'S EQUIPMENT**

# Customer Education and Home Set-Up

Reviset 22-07-03

## 13.1 GENERAL

**CONGRATULATIONS**..... by now you have completed another Star Choice “Satellite” installation.

Up to this point, you have been a certified, professional installer and now it is time to switch hats from your installers’ hardhat to your professional Trainer’s hat.

**PROFESSIONAL INSTALLER**



TO

**PROFESSIONAL TRAINER**



### **ARE YOU AWARE WHO YOUR CUSTOMERS ARE?**

- You have both external and internal customers.
- Your external customer is the one you are installing the Star Choice system for.
- Your internal customers are the Customer Service Reps at the Activation and Customer Care Center.
- The way you treat ALL your customers will make you a winner in every way to ALL your customers.

Prior to starting your customer training, verify the following.

- Customer’s personal information such as name, address, postal code, telephone number, etc.
- Programming package the customer has requested – you may need to review the various programming options and answer any questions they may have.
- Call the Activation Center and verify account number, customer personal information, programming package and request activation.

This will save time, as you can start your customer training while the system is receiving the software download/activation. **(Refer to Section 16 – Documentation)**

### **REMEMBER THIS KEY POINT**

***A SATISFIED STAR CHOICE CUSTOMER IS THE BEST ADVERTISER, AND THAT A DISSATISFIED CUSTOMER CAN HELP TO RUIN A CUSTOMER OR A FUTURE STAR CHOICE CUSTOMER VIA WORD OF MOUTH.***



# Customer Education and Home Set-Up

Reviset 22-07-03

## 13.1 TRAINER TIPS

Before we get to the training procedures, lets review a few Trainer's tips on how you should present yourself and how to effectively train the Customer on use of their new Star Choice system.

### 13.1.1 YOU – THE TRAINER

Consider the following points on how you should present yourself while training the Customer:

- **Language** – If the Customer's first language is not the same as yours, he/she may have difficulty understanding what you need to accomplish. This can be further complicated by cultural expectations that can differ widely. Being aware of these differences can help you to communicate more effectively.
  - Modify your words to meet the customer's style, but do not "talk down" to them.
  - Try to avoid jargon, phrases, acronyms or technical terms.
  - Many people have a tendency to raise their voice or shout – your Customer isn't deaf, just has difficulty understanding you at this moment.
- **Proximity** – Stand or request permission to sit near the Customer, as you will need to show the customer the remote control as well as pass it back and forth. North American culture usually allows a 1.5 to 2 foot distance when talking to another and do not be surprised if you have a Customer that "hovers" over you while you work.
- **Eye Contact** – Varies from culture to culture; in North America we expect frequent eye contact, while eye contact all the time (staring) is considered rude. In some cultures women may not look at you directly, or they will be uncomfortable speaking to you.
- **Gestures** – Keep physical gestures to a minimum in order to avoid any embarrassing misunderstood incidents.
- **Facial Expression** – Be careful not to use facial expressions as some Customers may take it the wrong way.
- **Physical Contact** – Avoid physical contact with the Customer. In today's environment of abuse charges etc, it may result in accusations.
- **Overall Appearance** – Keep yourself looking neat and prepare yourself prior to entering the Customer's home. (Comb your hair, tuck in your shirt, etc.)

### OLD CHINESE PROVERB

**YOU AND THE CUSTOMER AGAINST THE PROBLEM  
NOT  
YOU AND THE PROBLEM AGAINST THE CUSTOMER**



# Customer Education and Home Set-Up

Revised 22-07-03

## **13.1 TRAINER TIPS cont'd**

### **13.1.2 LISTENING – A LOST ART**

Studies show that we spend about 80% of our waking hours communicating. And, according to research, at least 45% of that time is listening. In business, listening has often been cited as the most critical management skill.

However,

- Most individuals are inefficient listeners.
- Inefficient and ineffective listening is extraordinarily costly and leads to misunderstanding.
- Good listening can be taught.

#### **DO NOTS of good listening:**

- ✓ Jump to conclusion.
- ✓ Exhibit biases and prejudices.
- ✓ Hear only what you want to hear.
- ✓ Hear only what you expect to hear.
- ✓ Get distracted.
- ✓ Not getting or giving feedback.
- ✓ Interrupt the speaker.
- ✓ Misunderstanding words because of jargon.

#### **HOW TO Listen:**

- Eliminate or shut out distractions.
  - ✓ Stop talking; concentrate on Customer's words.
- Listen unemotionally.
  - ✓ Listen attentively – listen beyond the tone “attitudes”.
  - ✓ Do not take comments personally.
- Ask questions.
  - ✓ Clarify points you do not understand.
  - ✓ Rephrase what the Customer is saying.
- Understand the basic theme of the conversation.
  - ✓ Recognize signs such as emotional state.
  - ✓ Investigate your assumptions before you act – do not jump to conclusions.
- Relate to the Customer.
  - ✓ Be sensitive and empathize.
  - ✓ Use listening responses.
  - ✓ Be goal-oriented; help the Customer in the best way you can.



# Customer Education and Home Set-Up

Reviset 22-07-03

## 13.1 TRAINER TIPS cont'd

### 13.1.3 EQUIPMENT TRAINING TIPS

Your responsibilities include showing the Customer how to use the new Star Choice equipment. For many installers this is the best part of the job. Watch the excitement that is generated by the Customers who previously have had limited viewing opportunities, and now as they have a full range of programming.

#### **MAXIMUM ENTERTAINMENT – MINIMUM EFFORT**

- You need to develop a complete understanding of the equipment so that when you demonstrate it to the Customer it will seem very fluid and easy to use.
- Show the Customer how to access information in more than one way, for example using the Interactive Programming Guide (IPG) and by using the colour coded “Theme” buttons.
- Use more than one method of showing how equipment works. (i.e. User Guide, diagrams and “hands on”)
- Provide an opportunity for the Customer to try “hands on” before you leave to make sure they understand how to use it.
- Make sure the Customer has the toll free telephone number for the Star Choice Customer Care Center and that they understand they can phone 24 hours a day, seven days a week (24/7) for information on programming, account inquiries, technical information, user assistance, etc.

**Tip: Write the Star Choice Customer Care Center telephone number on the cover of the “User Guide”**

### Senior Citizens and/or Non-technical Customers

- **Be patient** – Physical problems for some seniors (such as vision or arthritis) may mean they need an extra moment to get used to using the remote control.
- Some Customers may not be used to the “high tech” equipment and feel slightly intimidated. When demonstrating how to use, make sure you choose a language that is appropriate to their level of understanding without “talking down” to the Customer.
- If there are children present of a suitable age, suggest to the Customer that they are welcome to sit-in. It is a known fact that young children these days are very adapt at learning new things in this computer age we are in.

**PROFESSIONALISM AND COURTESY  
ARE TO BE DEMONSTRATED AT ALL TIMES**



# Customer Education and Home Set-Up

Reviset 22-07-03

## 13.2 EQUIPMENT TRAINING

### 13.2.1 GENERAL



Welcome the customer to Star Choice and tell the customer that you are delighted to be bringing an exciting new world of satellite television into their home. Advise the customer that you are going to spend the next 20 to 30 minutes or longer if required, to demonstrate how simple – “SATELLITE” is to use.

**REMEMBER**  
**BE PROFESSIONAL**



**DO NOT LOSE**  
**YOUR PATIENCE**



### 13.2.2 HANDOUTS

Prior to starting your training session hand the Customer the “Welcome To Star Choice” handout.

Suggest to the Customer that she/he may wish to have a pen to make notes as you demonstrate to the Customer on how to use the Star Choice system.

Before starting your training session briefly review the handout and stress the following items:

- Page 5 - IPPV connection.
- Pages 6,7 – Screen functions.
- Pages 8,9 – Channel numbers.
- Page 9 - Remote Control flip-out with a description for each button.
- Page 10 – INFO channel and website access
- Page 12 – Billing explanation
- Page 14 – Basic troubleshooting prior to calling the Customer Care center.
- Page 15 – Terms of Service Agreement



# Customer Education and Home Set-Up

Reviset 22-07-03

## 13.2 EQUIPMENT TRAINING cont'd

### 13.2.3 TRAINING

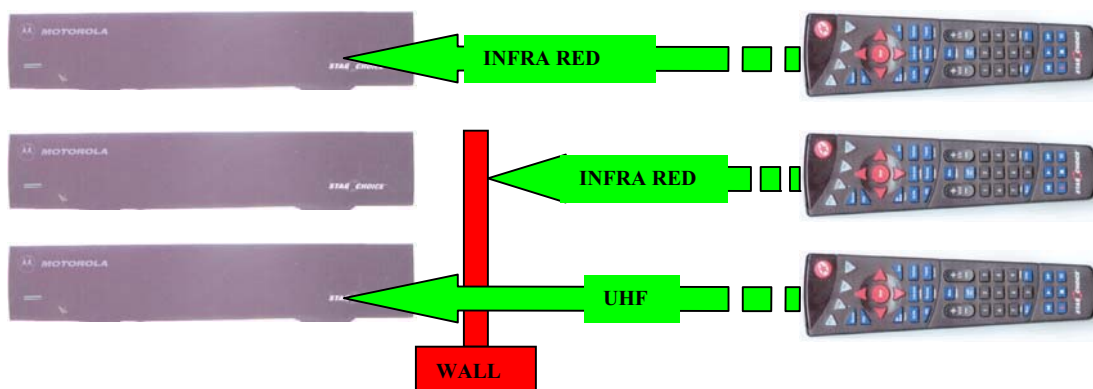
#### STEP 1

- Program the remote control to operate the TV and VCR (if applicable). Show the Customer Section 3 in the User Guide and demonstrate the two methods of programming the remote control.
- Explain the various functions of the remote control and once the overview is completed, proceed with the demonstration.
- Turn all equipment OFF.



#### STEP 2

- Explain the difference between “Infra Red” (IR) remote controls versus UHF remote controls and the importance of line-of-sight for IR remote controls.





# Customer Education and Home Set-Up

Reviset 22-07-03

## 13.2 EQUIPMENT TRAINING cont'd

### 13.2.3 TRAINING

#### STEP 3

- Turn on the TV set and then the Star Choice receiver with the Star Choice remote control.
- Explain how the Star Choice system is connected to the TV set and demonstrate how to obtain the proper “Input” on the TV set.
- Once a picture is obtained proceed with the balance of the demonstration and refer to the handouts (as required), where the information can be located.

There is no set procedure to demonstrate all the capabilities of the Star Choice system, however, the following is a recommended minimum that should be shown to the Customer.

Customer training **IS MANDATORY** and should include the following instructions:

1. Turning the system on and off.
2. Locating the Options Menu.
3. Navigating around the Options Menu.
4. Locating the Interactive Program Guide (IPG).
5. Selecting a program.
6. Selecting program “Info”.
7. Ordering an IPPV event.
8. Checking IPPV purchases.
9. How to set up a “Favorite Channel” guide.
10. How to set “Parental Control” locks for certain types of viewing and where to find them in the manual.
11. Setting TV and VCR codes. They may need re-entering after replacing batteries in the hand held remote control unit. **Show them again the two methods and where to find the instructions in the User Guide.**
12. How to record a movie if a VCR is present, by use of the timers or selecting from the IPG.
13. Checking the signal status.
14. The Table of Contents in the front of the User Manual to enable the customer to locate specific functions of the Star Choice system.
15. Remind the Customer to **cancel their existing provider** service to avoid future billing.

**REMEMBER** a customer that does not understand how the system works or gets frustrated will only call the Star Choice Customer Care Center line for assistance or if the customer is too frustrated they may request the system be disconnected and removed because they think the system does not work properly.



# Customer Education and Home Set-Up

Revised 22-07-03

## 13.3 COMMON AUDIO/VIDEO TERMS

As you gather information about the newer TV sets, home theater systems and HDTV you will likely come across some terminology that may be alien. Prior to the next section on home equipment wiring configurations here is a brief Glossary to help you with some common terms in alphabetical order that may be referred to.

### **AC-3**

The 5.1-channel sound system specified in the Standard for Digital-HDTV. Also known as “Dolby Digital”, AC-3 delivers DC-quality digital audio and provides five full-bandwidth audio channels for front left, front right, center, surround left and surround right speakers plus an LFE (low frequency effect) subwoofer, for a total of 5.1 channels.

### **A/D**

Analog to digital conversion (or converter). Used at transmission end of broadcast.

### **Analog TV**

Analog TV is the NTSC Standard for traditional television broadcasts. Analog signals vary continuously, representing fluctuations in color and brightness.

### **Artifacts**

Unwanted visible effects in the picture created by disturbances in the transmission or image processing, such as “edge crawl” or “hanging dots” in analog pictures, pixelation in digital pictures.

### **Aspect Ratio**

Refers to the width of a picture relative to its height. If an NTSC picture is 4 feet wide, it will be 3 feet high; thus it has a 4:3 aspect ratio. HDTV has a 16:9 aspect ratio.

### **Component Video**

The output of a video device (such as the Star Choice HDTV Decoder), or the input of a DTV receiver or monitor consisting of 3 primary color signals: red, green and blue that together convey all necessary picture information. With current consumer video products, the 3 component signals have been translated into luminance (Y) and two color difference signals (Pb, Pr), each on a separate wire.

### **Composite Video**

An analog, encoded video signal (such as NTSC) that includes vertical and horizontal synchronizing information. Since both luminance (brightness) and chrominance (color) signals are encoded together, only on a single connection wire is needed. (I.e. yellow cable on the RCA cable).

# *Customer Education and Home Set-Up*

Reviset 22-07-03

## **13.3 COMMON AUDIO/VIDEO TERMS cont'd**

### **D/A**

Conversion of digital to analog signals. The device is also referred to as DAC (D/A converter). In order for conventional analog television technology to display the digitally transmitted signal received on the Star Choice satellite receiver, the data must be decoded first and converted to an analog signal.

### **DBS**

Abbreviation of "Digital Broadcast Satellite" – refers to digital TV transmissions via satellites such as Star Choice.

### **DTV**

Abbreviation of "Digital Television" - refers to all formats of digital television, including high definition television (HDTV) and standard definition television (SDTV).

### **HDTV**

The generally agreed upon definition of HDTV is approximately twice the vertical and horizontal picture display resolution of today's NTSC TV, which essentially makes the picture twice as sharp. HDTV also has a screen ratio of 16:9 as compared with most of today's TV screens, which have a screen ratio or 4:3. HDTV offers reduced motion artifacts (i.e. ghosting, dot crawl), and offers 5.1 independent audio channels of CD-quality stereo sound, also referred to as AC-3.

### **Interlaced Scanning**

In a television display, interlaced scanning refers to the process of assembling a picture from a series of electrical (video) signals. The "standard" NTSC system uses 525 scanning lines to create a picture (frame). The frame/picture is made up of two fields: The first field has 262.5 odd lines (1,3,5...) and the second field has 262.5 even lines (2,4,6...). The odd lines are scanned (or painted on the screen) in 1/60<sup>th</sup> of a second and the even lines follow the next 1/60<sup>th</sup> of a second. This presents an entire frame/picture of 525 lines in 1/30<sup>th</sup> of a second. (Note: Check the back of the Star Choice HDTV Decoder where the Video Format Selector Switch is located – 1080i refers to 1080 lines of resolution that are interlaced)

### **Letterbox**

The term letterbox is used to describe the way a 16:9 aspect ratio image is displayed on a 4:3 aspect ratio screen, where the black areas are visible above and below the image.

### **Native**

HDTV ready displays will display video in whatever screen format is broadcast (i.e. 480p, 720p, 1080i)





# ***Customer Education and Home Set-Up***

Reviset 22-07-03

## **13.3 COMMON AUDIO/VIDEO TERMS cont'd**

### **NTSC**

National Television Standards Committee responsible for developing Standards for “traditional” Analog TV, prior to Digital-HDTV.

### **Progressive Scanning**

In progressive scanning, typically used with VGA computer monitors, all the horizontal lines are “painted” on the screen at one time. Adopted DTV formats include both interlaced and progressive broadcast and display methods. (Note: Check the back of the Star Choice HDTV Decoder where the Video Format Selector Switch is located – 480p and 720i refers to 480 and 720 lines of resolution that are progressively scanned)

### **Resolution**

Is the density of lines and dots per line that make up a visual image. Usually, the higher the numbers, the sharper and more detailed the picture will be. In terms of DTV, maximum resolution refers to the number of horizontal scanning lines multiplied by the total number of pixels per line. Called pixel density.

### **S-Video**

Separated video is an encoded video signal that separates the brightness from color data. S-video can greatly improve the picture when connecting to any high quality video source such as a Star Choice satellite receiver or DVD.

### **SDTV**

Standard Digital Television (SDTV) refers to Digital transmissions with 480-line resolution, either interlaced or progressive scanned formats. SDTV offers significant improvement over today’s conventional NTSC picture resolution, similar to comparing DVD quality to VHS, primarily because the digital transmission eliminates snow and ghosts, common with current NTSC analog format. However, SDTV does not come close to HDTV in both video and audio quality.

### **UHF, VHF**

Ultra high frequency, the range used by TV channels 14 through 69 and very high frequency, the range used by TV channels 2 through 13.

### **Y, Pb, Pr**

The most advanced method for interconnecting decoded video data. Generally used where a digital TV signal source is used. Preferred connection for High Definition TV signals; enables superior quality in transmitted picture. The video signal is separated into its component parts brightness and color differentials.

# Customer Education and Home Set-Up

Reviset 22-07-03

## 13.4.1 INTERCONNECTION CABLES

### RF COAXIAL CABLE



RF COAXIAL CABLE  
"F" TYPE SCREW-ON  
CONNECTOR  
**RECOMMENDED**

RF COAXIAL CABLE  
"F" TYPE PUSH-ON  
CONNECTOR  
**DO NOT USE**



- Replace ALL push-on type cables due to their frequent cause of problems.
- Provides good picture and good **non-stereo** audio quality.

### RCA AUDIO/VIDEO CABLES (COMPOSITE VIDEO)



- Red RCA cable is for "Right side" audio channel.
- White RCA cable is for "Left side" audio channel.
- Yellow RCA cable is for "Composite" video.
- For mono audio devices use the red audio cable.
- Provides better picture and stereo audio quality.

**\*\*\*RECOMMENDED CONNECTION BY STAR CHOICE INSTALLERS\*\*\***

### S-VIDEO CABLE



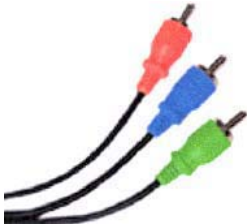
- S-video cable carries **ONLY** the video signal.
- **RCA audio cables are also required.**
- Best video quality and stereo audio.
- Separated video is an encoded video signal that separates the brightness from color data. S-video can greatly improve the picture when connecting to any high quality video source such as a Star Choice satellite receiver or DVD.

# Customer Education and Home Set-Up

Reviset 22-07-03

## 13.4.1 INTERCONNECTION CABLES cont'd

### COMPONENT VIDEO CABLES



- The most advanced method for interconnecting decoded video data. Generally used where a digital TV signal source is used. Preferred connection for High Definition TV signals; enables superior quality in transmitted picture. The video signal is separated into its component parts brightness and color differentials.
- The output of a video device (such as the Star Choice HDTV Decoder), or the input of a DTV receiver or monitor consisting of 3 primary color signals: red, green and blue that together convey all necessary picture information. With current consumer video products, the 3 component signals have been translated into luminance (Y) and two color difference signals (Pb, Pr), each on a separate wire.

### MULTIMEDIA PORT (MMAP) CABLE



- The MMAP cable connects the Star Choice receiver High Speed Data Output to the High Speed Data Input on the HDD-200 High Definition Decoder.
- This connection is required for HDTV.
- The generally agreed upon definition of HDTV is approximately twice the vertical and horizontal picture display resolution of today's NTSC TV, which essentially makes the picture twice as sharp. HDTV also has a screen ratio of 16:9 as compared with most of today's TV screens, which have a screen ratio or 4:3. HDTV offers reduced motion artifacts (i.e. ghosting, dot crawl), and offers 5.1 independent audio channels of CD-quality stereo sound, also referred to as AC-3.

### DOLBY DIGITAL CABLE (AC-3)



- The 5.1-channel sound system specified in the Standard for Digital-HDTV. Also known as “**Dolby Digital**”, AC-3 delivers DC-quality digital audio and provides five full-bandwidth audio channels for front left, front right, center, surround left and surround right speakers plus an LFE (low frequency effect) subwoofer, for a total of 5.1 channels

# Customer Education and Home Set-Up

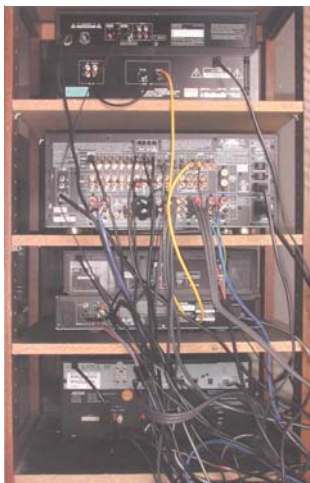
Reviset 22-07-03

## 13.5 EQUIPMENT COFIGURATIONS

### 13.5.1 GENERAL

There is nothing else to say but “WHAT A RAT’S NEST”, when you view the back of a fully connected **Home Theater System**.

HOME THEATER SYSTEM

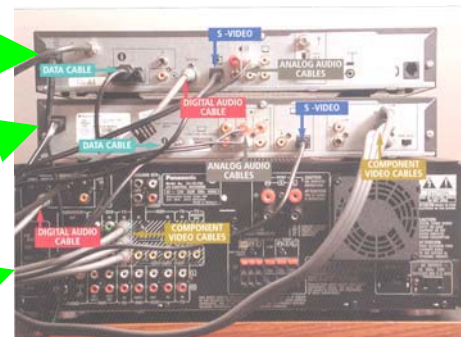


STAR CHOICE 405 HIGH  
DEFINITION SATELLITE  
RECEIVER

STAR CHOICE HDD201  
HIGH DEFINITION  
DECODER

HOME THEATER SYSTEM

STAR CHOICE “HDTV” SYSTEM



The above illustrations clearly show the complex in-home wiring configurations involved with home theater systems involving HDTV. In some cases, home theater/audio professionals install these types of systems. You are only expected to connect the video and audio from the Star Choice equipment into the HDTV inputs.

There may be cases where you or the Customer does not have the necessary cables to interface with the wide range of home entertainment equipment available today and as a Star Choice installer you are not expected to.

At this point, advise the Customer that you will install the basic HDTV installation and they will be responsible for completing a fully installed home theater system. Explain to the Customer that you could spend hours reading user manuals to familiarize yourself with their equipment that you may never see again.

Your Star Choice Supervisor will establish installation policies for high-end systems.

**The next few sub-sections provide wiring configurations and notes starting from the basic system and builds up to a basic HDTV system.**

# Customer Education and Home Set-Up

Reviset 22-07-03

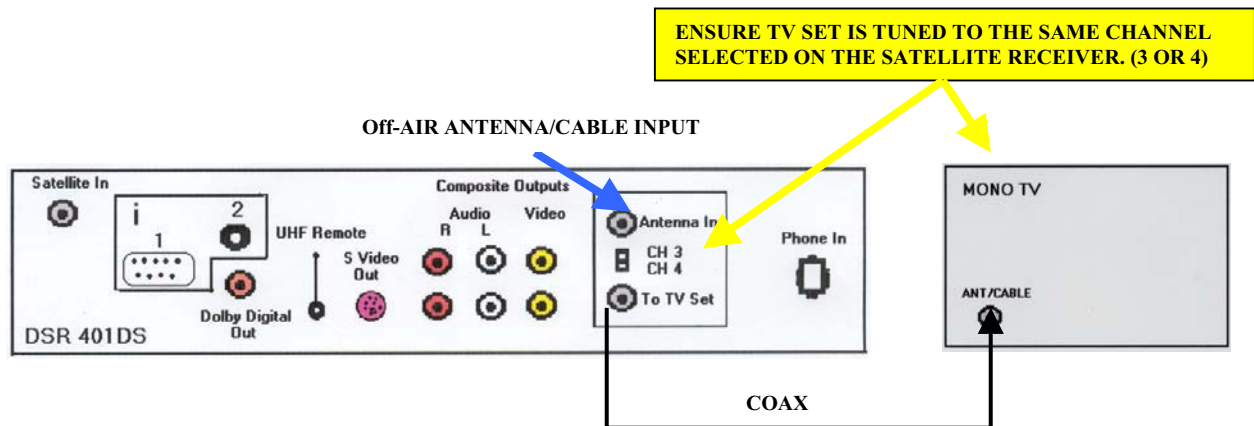
## 13.5 EQUIPMENT COFIGURATIONS cont'd

### 13.5.2 BASIC TV SETUP (RF/VHF VIDEO)

This setup is a basic connection and is **NOT recommended**, however there may be an installation where the Customer's TV set only has an RF coax connection.

#### NOTES:

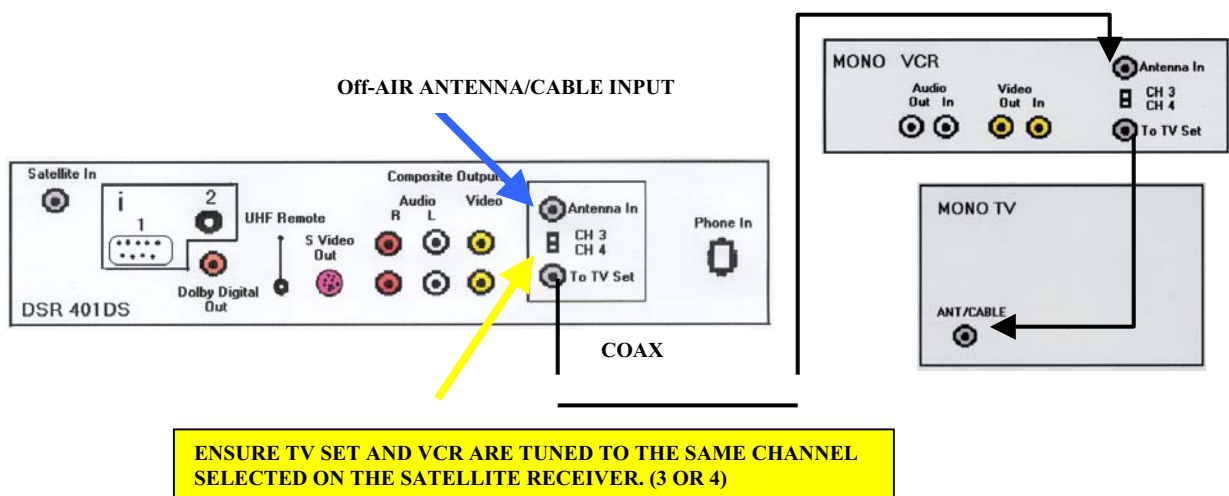
- Only connection available due to restricted TV input – RF only.
- TV set **MUST** be tuned to channel 3 or 4 to match selection on satellite receiver.
- This RF connection provides the good quality video and **non-stereo** audio.



### 13.5.3 BASIC TV/VCR SETUP (RF/VHF VIDEO)

#### NOTES:

- Same as above.





# Customer Education and Home Set-Up

Reviset 22-07-03

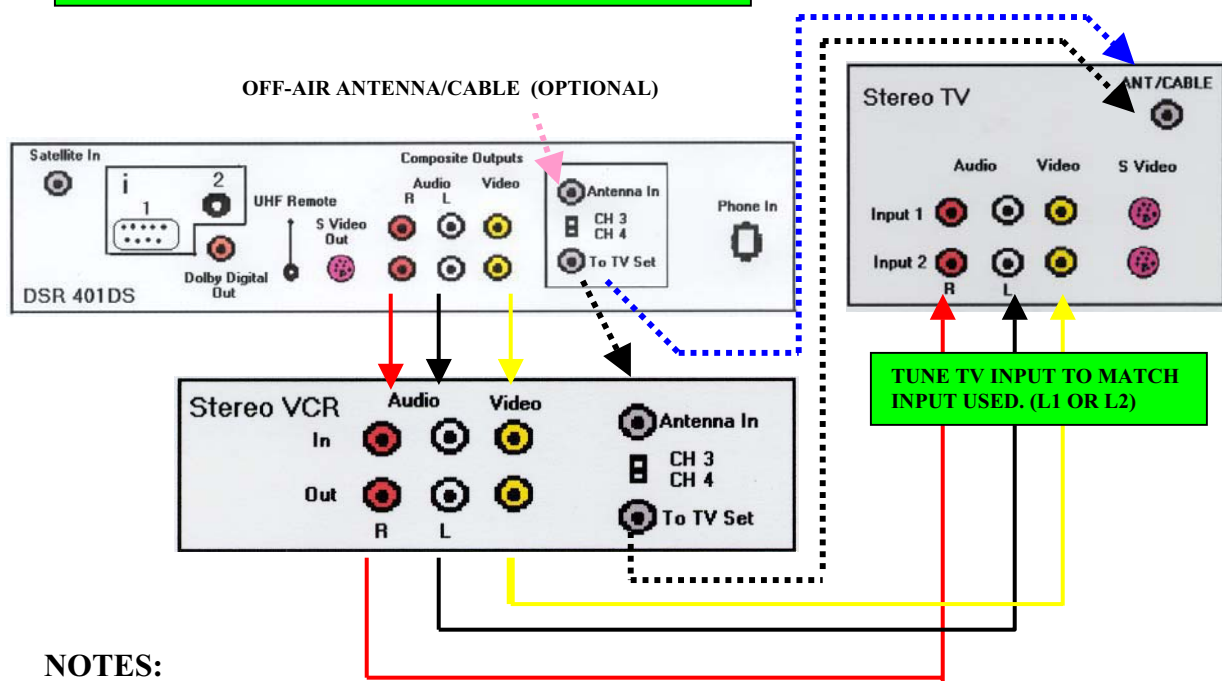
## 13.5 EQUIPMENT COFIGURATIONS cont'd

### 13.5.4 AUDIO/VIDEO TV/VCR SETUP (COMPOSITE VIDEO)

The following installation will be the most common installation for the next few years and is the **recommended** installation for Star Choice installers.

Most TV sets and VCRs today have the A/V inputs therefore why would you install a basic RF type coax system when you have just installed a Digital Satellite System. The Customer is entitled to the Star Choice recommended A/V composite video installation that provides **superior quality video and stereo audio** when compared to a basic RF installation.

#### Recommended Star Choice Satellite Installation



#### NOTES:

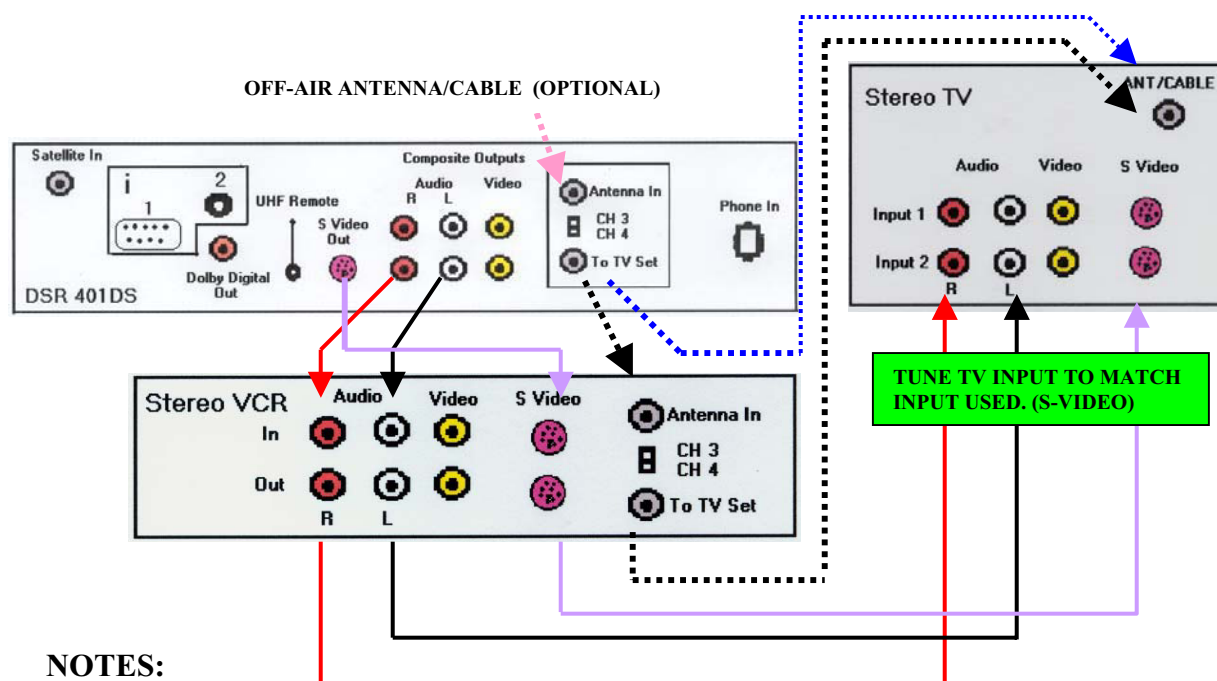
- Set VCR input to "L1" or "VIDEO".
- Set TV to match the connected "INPUT" used. (i.e. VIDEO 1 or 2).
- If the Customer has an "off-air" or "cable" input then you will be required to install the coax cables between the satellite receiver and the TV set or the satellite receiver and the TV set and VCR.
  - ...➤ OPTION 1: Turn satellite off and select channels with TV set.
  - ...➤ OPTION 2: Turn off satellite, set TV to channel 3 or 4 and select the channel with the VCR. Allows recording of off-air or cable channels.

# Customer Education and Home Set-Up

Reviset 22-07-03

## 13.5 EQUIPMENT COFIGURATIONS cont'd



### 13.5.5 S-VIDEO TV/VCR SETUP



#### NOTES:

- Set VCR input to "S-VIDEO".
- Set TV input to "S-VIDEO".
- **CAUTION** – The S-VIDEO cable ONLY carries the video signal; the two RCA audio cables MUST be installed to provide the audio signals.

#### OPTION FOR AN EXTERNAL OFF-AIR ANTENNA OR CABLE INPUT

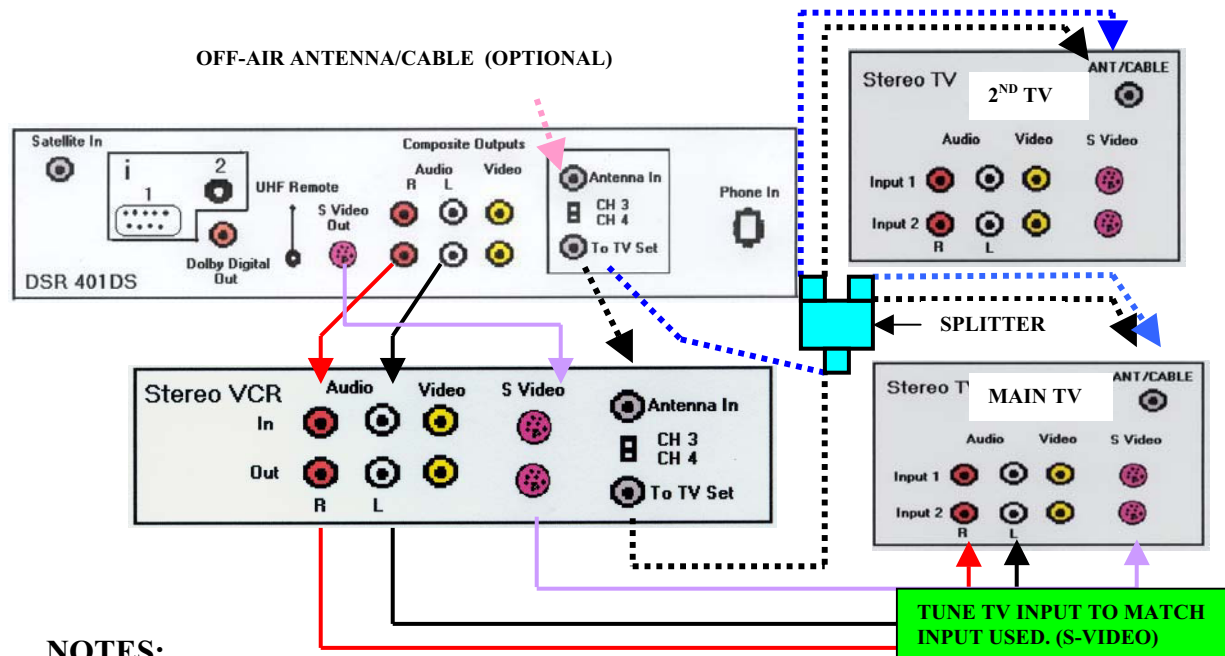
- If the Customer has an "off-air" or "cable" feed then you will be required to install the coax cables between the satellite receiver and the TV set or between the satellite receiver and the TV and VCR.
  -  OPTION 1: Turn satellite off, set TV input to UHF/VHF channel option and select channels with TV set.
  -  OPTION 2: Turn off satellite, set TV and VCR to UHF/VHF channel option, set TV to channel 3 or 4 and select the channel with the VCR. This option allows for recording off-air and/or cable channels.

# Customer Education and Home Set-Up

Reviset 22-07-03

## 13.5 EQUIPMENT COFIGURATIONS cont'd

### 13.5.6 S-VIDEO TV/VCR SETUP WITH 2<sup>ND</sup> TV



#### NOTES:

- Set VCR input to "S-VIDEO".
- Set TV input to "S-VIDEO".
- **CAUTION** – The S-VIDEO cable ONLY carries the video signal; the two RCA audio cables MUST be installed to provide the audio signals.

#### OPTION FOR AN EXTERNAL OFF-AIR ANTENNA/CABLE INPUT WITH 2<sup>ND</sup> TV SET.

- For "off-air" or "cable" viewing install coax cables and a "splitter" between the satellite receiver and the two TV sets or install the "splitter" at the output of the VCR if recording of off-air/cable channels is required.
  - ---➤ **OPTION 1:** Turn satellite off, set TV input to UHF/VHF channel option and select channels with TV set.
  - ---➤ **OPTION 2:** Turn off satellite, set TV and VCR to UHF/VHF channel option, set TV to channel 3 or 4 and select channel with the VCR.

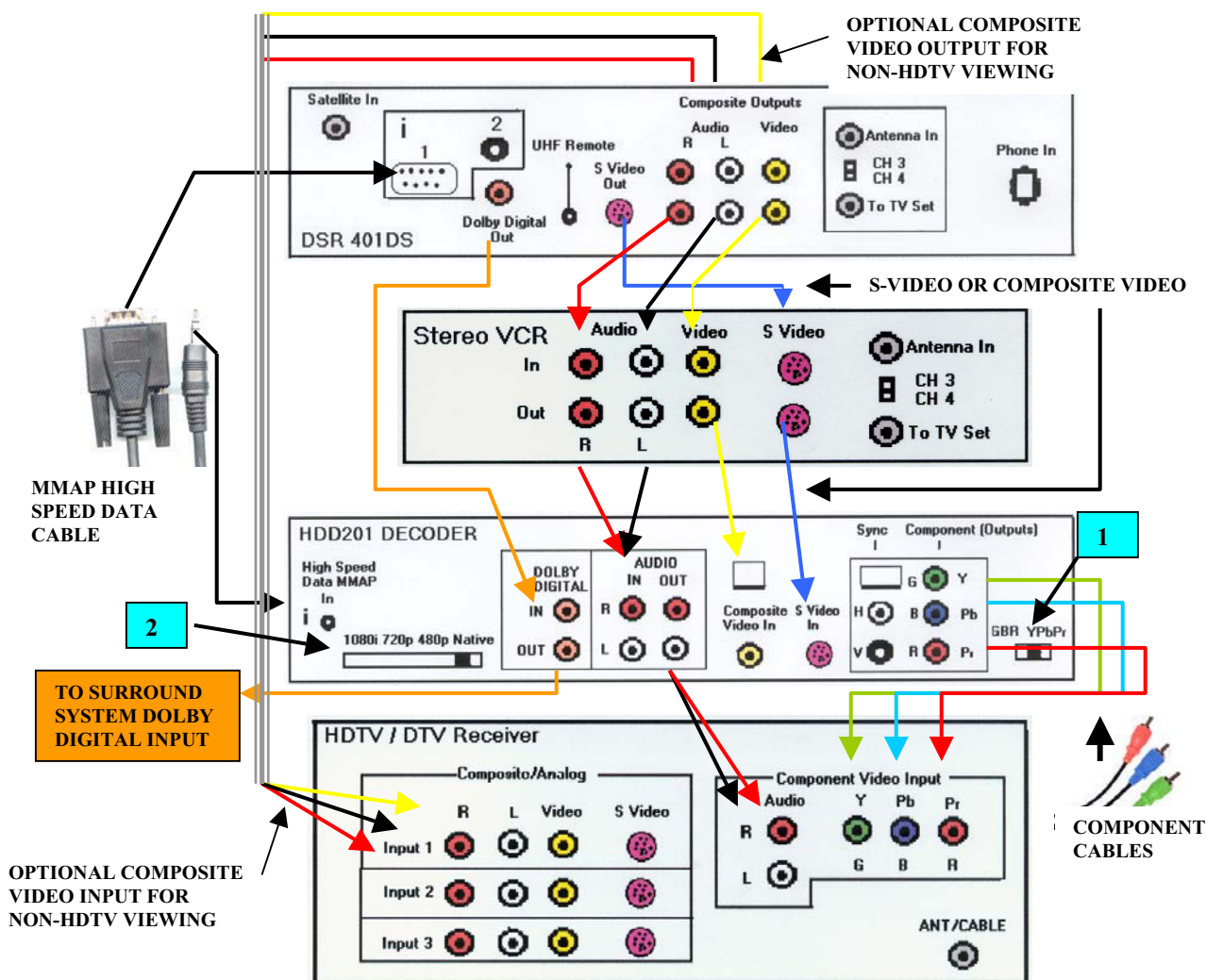
Depressing the "SOURCE" button on the Star Choice satellite remote control will leave the satellite viewing on the MAIN TV set and switch the 2<sup>ND</sup> TV set to off-air/cable viewing providing an option of having alternate viewing on the 2<sup>nd</sup> TV set without interrupting the MAIN TV set satellite feed.

# Customer Education and Home Set-Up

Revised 22-07-03

## 13.5 EQUIPMENT CONFIGURATIONS cont'd

### 13.5.7 HDTV SET-UP



#### SWITCH NOTES:

- 1 GBR/YPbPr SWITCH** - The vast majority of consumer HDYV-ready displays use the component-video connection, so for almost everyone "YPbPr" is the right setting.
- 2 VIDEO FORMAT SWITCH** - The video format switch lets you choose between 1080i, 720p, 480p or Native that is set to match the input capability of the HDTV. A few HDTV-ready displays will display video in whatever screen format that is broadcast; for these "Native" is the correct setting. The vast majority of CRT-based (Picture tube) display HDTV-ready displays, both rear-projection and direct-view TVs, accept 1080i input, so 1080i is the correct setting. Flat panel plasma and LCD HDTV-ready displays are designed for 720p input. There are also flat-panel standard-definition displays that will show high-definition pictures but not in full high-definition format; 480p is the correct setting for these displays.



# Customer Education and Home Set-Up

Reviset 22-07-03

## 13.5 EQUIPMENT COFIGURATIONS cont'd

### 13.5.7 HDTV SET-UP

#### **TIPS:**

- The HDD200 series decoder contains General Instrument's (GI) proprietary technology that is **only** compatible with GI products that are based on the "DigiCipher II" technology. These products include Star Choice satellite receivers, GI digital cable boxes and the C-Band satellite 4DTV receiver.
- S-VIDEO cables **DO NOT** carry audio signals therefore; two separate audio cables **MUST** be installed with the S-VIDEO cable.
- COMPONENT VIDEO high definition video cables **DO NOT** carry audio signals therefore; two separate audio cables **MUST** be installed.
- VCRs **CANNOT** record high definition video (HDTV) broadcasts therefore; a COMPOSITE or S-VIDEO connection with two audio cables must be installed.
- Some HDTV customers have complained of "ghosting" on the screen – this source cannot be bad reception as it is not possible in digital transmission. The cause is most likely the last 3-5 feet of cable feeding the TV that will likely be a poor connection or poor quality cable. Another source can be poor or no grounding i.e. missing third "ground" prong on the power cord.
- **TV SETS (TYPICALLY FOUR TYPES):**
  - **Analog TV set** – conventional TV set.
  - **Digital-ready TV set** – also referred to as SDTV sets. These TVs are normally 480p displays with an analog tuner (for normal channels 2 through 83) built in. They have a maximum resolution of low 480p SD resolution, which eliminates the HD resolutions and makes them essentially useless in the future of HDTV viewing.
  - **HDTV-ready set** – These are essentially "computer monitors" able to display 1080i/p resolution in the 16:9 aspect ratio. They may or may not have analog tuners built in.
  - **Integrated HDTV set** – These sets have a digital tuner for broadcast DTV signals integrated into the HDTV display.

### 13.5.8 OPTIONAL HDTV SET-UP FOR REGULAR BROADCASTS

There are two ways to handle video from regular (non-HDTV) channels.

#### **Video Method 1:**

- Connect the S-VIDEO cable from the satellite receiver S-VIDEO output to the S-Video input on the HDTV set.
- Switch the TV set to the S-VIDEO input when watching regular broadcasts and switch the TV set input to the component-video when watching high-definition broadcasts.
-





# ***Customer Education and Home Set-Up***

Reviset 22-07-03

## **13.5 EQUIPMENT COFIGURATIONS cont'd**

### **13.5.8 OPTIONAL HDTV SET-UP FOR REGULAR BROADCASTS cont'd**

#### **Video Method 2:**

- Connect the S-VIDEO cable from the satellite receiver to the S-Video input on the HD decoder.
- This method allows the use of the COMPONENT VIDEO input on the HDTV set for viewing both types of broadcasts.
- This method is easier for day-to-day use but the video quality on regular broadcasts is not as good as Method 1.

#### **Audio Method 1 (Non-digital):**

- If connecting to an older stereo surround receiver without digital audio, or using the TV's internal sound system, connect the two audio RCA output jacks on the satellite receiver to the corresponding input jacks on the HD decoder (arrows pointing in).
- Connect the HD decoder audio output jacks (arrow pointing out) to the stereo, surround sound or TV set audio input jacks.
- If watching regular channels on the TV S-VIDEO input connect the audio output from the satellite receiver to the audio input jacks associated with the S-Video input on the TV or audio receiver.

#### **Audio Method 2 (Digital):**

- If connecting to a digital surround receiver, connect an optical cable from the optical output on the satellite receiver to the optical input on the digital surround sound system.



## INSTALLATION HANDBOOK

### 14.0

### APPROVED PARTS LIST



# Approved Parts List

Revised 22-07-03

## **14.1 GENERAL**

All hardware and material required to successfully install Star Choice satellite systems will be supplied or approved by Star Choice Communications. **Exhibit 14.1 on page 3 and 7** is the order form (Inventory Re-order Form) lists all APPROVED hardware and material provided by Star Choice.

Any deviation or substitution of the hardware and material approved by Star Choice MUST be approved in writing by the Star Choice Installation Team prior to its use.

**To PROVIDE and MAINTAIN a quality product and service to Star Choices' valued Customers, ONLY Star Choice Communications standardized and approved material will be used on ALL Star Choice installations.**

The following exhibit and attachments containing the APPROVED hardware and material will be continuously monitored and updated for additions, improvements and upgrades, as required.

The Star Choice Installation Team is always looking for ways to improve the installation process or to assist installers and their Contractors in their installation duties and welcomes any suggestions or ideas for improvement. Simply contact one of the Installation Supervisors to discuss your idea or suggestion.



# Approved Parts List

Revised 22-07-03

## EXHIBIT 14.1 PAGE 1 OF 5

### INVENTORY RE-ORDER FORM – HARDWARE/MATERIAL APPROVED BY STAR CHOICE

YOU HAVE A CHOICE.  
**STAR CHOICE**  
LA LIBERTÉ.

**Inventory Re-Order Form**

Name: \_\_\_\_\_ Shipping Address: \_\_\_\_\_

Agent ID: \_\_\_\_\_

Date: \_\_\_\_\_

**Systems:**

305 System ☐ Quantity \_\_\_\_\_ 405 System ☐ Quantity \_\_\_\_\_

**Receivers:**

305 Receiver ☐ Quantity \_\_\_\_\_ 405 Receiver ☐ Quantity \_\_\_\_\_

**Decoders:**

HDD201 ☐ Quantity \_\_\_\_\_

**Installation Products:**

Inventory	Part Number	Supplier	Quantity	Cost
<b>REMOTES</b>				
4:1 Remote	Basicremote-4:1	Barrett		
UHF Remote Kit	4in1UHFRemote-kit	Barrett		
<b>COAXIAL CABLES</b>				
Commscope Coax Cable (black)(box)RG6 2.2 ghz	BXI-880-0315	Barrett		
CommscopeCoax Cable (white)(box)RG6 2.2 ghz	BXI-880-0314	Barrett		
Commscope Coax Cable (grey)(box)RG6 2.2 ghz	BXI-RG6Grey	Barrett		
Commscope Coax Cable (beige)(box)RG6 2.2 ghz	BXI-RG6Beige	Barrett		
Commscope <b>Dual</b> Coax Cable (black)(reel) 2.2 ghz	880-0318	Barrett		
Commscope Coax Cable(black)(reel)RG11	BXI-RG-11	Barrett		
RG-6 Messenger 2.2 ghz	Beldon	White Radio		
<b>CONNECTORS / SPLICES / TERMINATORS</b>				
Snap/Seal Outdoor Connects RG6	BXI-SNS6-1P	Barrett		
Snap/Seal Outdoor Connects RG59	BXI-SNS59	Barrett		
Snap/Seal Outdoor Connects RG11	BXI-SNS11AS	Barrett		
FT1 Terminator	BXI-910-0212	Barrett		
F81 2.2GHz Splice	BXI-F812G	Barrett		
Locking Terminator - without resistor	GTP59LR	TVC Comcourse		
<b>GROUNDING EQUIPMENT / GROUND WIRE</b>				
Single 2.2GHz GND Block	BXI-GBS2G	Barrett		
Dual 2.2 GHz GND Block	BXI-GBD2G	Barrett		
Ground Wire 12 Gauge	BXI-500GRNWIRE	Barrett		
Ground Wire 12 gauge White	BXI-500GRNWIRE Black	Barrett		
Ground Wire 12 gauge Black	BXI-500GRNWIRE White	Barrett		
JY BONDING CLAMP-Metre Pan	BXI-SCS1	Barrett		
6" Copper Ground Strap	BXI-GRNSTRAPC	Barrett		
12" Copper Ground Strap	BXI-GRNSTRAPC12	Barrett		
6" Galvanized Ground Strap	SC13BZ-1	SACHS	Barrett	
12" Galvanized Ground Strap	SC13BZ-3	SACHS	Barrett	
Pipe Clamp - 1/2" to 1" waterpipe	BXI-GCSUL	Barrett		
Ground Connector - for #4-6 wire	SC42	SACHS		
#6 Split Bolt	BXI-SB6	Barrett		
Pole GND Lug	BXI-LA2	Barrett		



# Approved Parts List

Revised 22-07-03

## EXHIBIT 14.1 PAGE 2 OF 5

### INVENTORY RE-ORDER FORM – HARDWARE/MATERIAL APPROVED BY STAR CHOICE

Inventory Re-Order Form		YOU HAVE A CHOICE. <b>STAR CHOICE</b> LA LIBERTÉ.	
<b>WEATHERPROOFING</b>			
Weatherproof sleeves ( Short)	BXI-WS375	Barrett	
Weatherproof sleeves (long)	BXI-WS500	Barrett	
JYCOS104 ½ x 60" Self Fusing Tape	BXI-910-0004	Barrett	
Pitch Pad Tape 3" wide ( Black )	TBT20	White Radio	
Silicon Sealant 80 ml.	BXI-SILICONL	Barrett	
Duxseal			
Spray Foam – Clear			
Black Electrical Tape		White Radio	
<b>WALLPLATES</b>			
White Wall Plate with 1- 2.2Ghz F81	50- CWPS20	Barrett	
White Wallplate With 2 - 2.2Ghz F-81's	50-CWPS30	Barrett	
F81 Nut	05-FNW10	Barrett	
<b>FASTENING HARDWARE / CLIPS / SCREWS / ANCHORS</b>			
Aluminium Clips rg-11	BX1-SC22-1	Barrett	
Aluminum Clips - RG6	BXI-SC20-1	Barrett	
Aluminum Clips - #14 Grd Wire	BXI-SC21-	Barrett	
Horizontal siding clips	BXI-HSCN	Barrett	
Vertical siding clips	BXI-VSCN	Barrett	
JY SINGLE TREAD CLIP - BLACK	BXI-SCS1/2-B	Barrett	
JY DUAL TREAD CLIP - BLACK	BXI-SCD1/2-B	Barrett	
JY SINGLE TREAD CLIP - White	BXI-SCS1/2-W	Barrett	
JY DUAL TREAD CLIP - WHITE	BXI-SCD1/2-W	Barrett	
Black Cable Tie (14")	BXI-910-0159	Barrett	
Black Cable Tie (7")	BXI-910-0167	Barrett	
Size = 2 1/2" Lag screw with Rubber washer washer			
Size= 14 x 2 inches roofing screws dacrotized	Price includes 25% escompte	Ancrages	
Size= 14 x 1 ½ inches roofing screws dacrotized	Price includes 25% escompte	Ancrages	
Size= 8 x ¾ inches Pan Head self taping screw	Price includes 25% escompte	Ancrages	
Size= 8 x 1 inches Pan Head self taping screw	Price includes 25% escompte	Ancrages	
Size= 8 x 1 inches flat head wood screw	Price includes 25% escompte	Ancrages	
Size= 8 x 1 ¼ inches flat head wood screw	Price includes 25% escompte	Ancrages	
Size= 3/16 plastic anchor	Price includes 25% escompte	Ancrages	
Size= 5/16 plastic anchor	Price includes 25% escompte	Ancrages	
Plastic Anchors 8-10 X 7/8"		White Radio	
Screw Pack Item - for dish assembly	6000592-03	Barrett	
Feed Through Bushing White Dual RG-6		Telecrafter	

Page 2 of 5





# Approved Parts List

Revised 22-07-03

## EXHIBIT 14.1 PAGE 3 OF 5

### INVENTORY RE-ORDER FORM – HARDWARE/MATERIAL APPROVED BY STAR CHOICE

Inventory Re-Order Form		YOU HAVE A CHOICE. <b>STAR CHOICE</b> LA LIBERTÉ.	
<b>TOOLS AND TEST EQUIPMENT</b>			
Snap/Seal RG59/6 Compression / Prep Tool	IT1000	White Radio	
Repalcement blades for above		White Radio	
Stripper Tool for RG59/6 Coax Cable	BXI-910-0160	Barrett	
Repalcement blades tool rg59/6 coax cable		Barrett	
Stripper Tool for RG59/6/7 & 11 Coax Cable	BXI-CST596711	Barrett	
Repalcement blades for tool rg59/6 & 11 coax		Barrett	
Snap/Seal RG11 Compression Tool	L3011B	White Radio	
T59 Tacker Gun- Insulated staples	Tacker	Barrett	
Staples for T59 (300) Black Insulated	Staples (300/box)	Barrett	
T25 Stapler		White Radio	
9/16" REGULAR STAPLES, T25 GUN	T25STAPLES (1000/box)	Barrett	
Size= 5/16 x 6 cement drill bit	Price includes 25% escompte	Ancrages	
Size= 3/8 x 18 wood bell hanger bit	Price includes 25% escompte	Ancrages	
Size= 3/8 x 20 cement drill bit		Ancrages	
Size=3/8 x 24 cement drill bit	Price includes 25% escompte	Ancrages	
Size=5/8 x 24 cement drill bit	Metabo	Ancrages	
Size=5/8 x 18 wood bit	Metabo	Ancrages	
Size= 9/16 x 20 cement drill bit	Metabo	Ancrages	
Size= 9/16 x 18 wood bit	Metabo	Ancrages	
Size= 3/16 x 6 cement drill bit	Price includes 25% escompte	Ancrages	
3/8" Hex Box Bit	Price includes 25% escompte	Ancrages	
Square Head Magnetic Bit # 8	Price includes 25% escompte	Ancrages	
Metal Blade for Hacksaw		laurentide	
Hacksaw		laurentide	
Cable Tester	BXI-810-0516	Barrett	
Pocket Toner	BXI-PT1	Barrett	
Pocket Toner Battery	BXI-PT1B	Barrett	
Satellite Finder w/audio Tone	BXI 810-0003	Barrett	
Digisat Digital Meter	BXI-810-0053	Barrett	
Digisat Accessory Kit	BXI-DIGISATKIT	Barrett	
Dual Sat Meter	BXI-1008IFD	Barrett	
Satellite Spectrum Analyzer	BXI-MC10-SAT	Barrett	
1/2 inches rope		laurentide	
<b>AMPLIFIERS</b>			
Sloped Line Amp	BXI-SA-2050	Barrett	
ILA20WS 950-2050 MHZ SLOPED LINE AMP	BXI-910-0171	Barrett	
Dual Power Inserter	BXI-910-0063	Barrett	
Voltage Stabilizer	BXI-DPS-22K-PT	Barrett	
Stacked LNB Launch Amp	BXI-TR36SLA	Barrett	
<b>SPLITTERS - DIRECTIONAL COUPLERS - DIPLEXERS</b>			
Diplexer	BXI-910-0110	Barrett	
Diplexer - non power passing	35-SDX100	Barrett	
Diplexer - Power passing	35-SDX100DC	Barrett	
<b>2 GHz NON-DIODE 1 PORT POWERED SPLITTERS</b>			
2 Way Non-Diode Splitter 1 Port Powered	BXI-910-0149	Barrett	
4 Way Non-Diode Splitter 1 Port Powered	BXI-910-0138	Barrett	
2 Way Non-Diode Splitter 1 Port Powered	BGI - S2H-2	TVC Comsource	
3 Way Non-Diode Splitter 1 Port Powered	BGI-S2H-3B	TVC Comsource	
<b>2 GHz NON-DIODE ALL PORT POWERED SPLITTERS</b>			
2 Way Non-Diode Splitter all Port Powered	BXI-910-0175	Barrett	



# Approved Parts List

Revised 22-07-03

## EXHIBIT 14.1 PAGE 4 OF 5

### INVENTORY RE-ORDER FORM – HARDWARE/MATERIAL APPROVED BY STAR CHOICE

YOU HAVE A CHOICE.  
  
 LA LIBERTÉ.

**Inventory Re-Order Form**

2 GHz DIODE ALL PORT POWERED SPLITTERS				
2-Way Diode Splitter all Port Powered	BXI-910-0162	Barrett		
2 Way Diode Splitter all Port Powered	BGI-S2H-2-PP	TVC Comsource		
3 Way Diode Splitter All Port Powered	BGI-S2H-3B-PP	TVC Comsource		
3 Way Diode Splitter All Port Powered	BXI-HFS32DN	Barrett		
4-Way Diode Splitter all Port Powered	BXI-910-0168	Barrett		
6-Way Diode Splitter all Port Powered	BXI-910-0172	Barrett		
8-Way Diode Splitter all Port Powered	BXI-910-0173	Barrett		

Wall Plate Taps				
WALL PLATE TAP (12DB)	25-HVS-12	Barrett		
WALL PLATE TAP (9DB)	25-HVS-9	Barrett		
WALL PLATE TAP (6DB)	25-HVS-6	Barrett		
WALL PLATE TAP (08DB)	BXI-STP108	Barrett		
WALL PLATE TAP (10DB)	BXI-STP110	Barrett		
WALL PLATE TAP (12DB)	BXI-STP112	Barrett		

DISH MOUNT PRODUCTS				
1-5/8" O.D. 21" J HOOK EXTENSION ARM, DISTANCE 12"	BTA	Barrett		
1-5/8" O.D. 29" J HOOK EXTENSION ARM, DISTANCE 16"	BTA-L	Barrett		
ELLIPTICAL ANTENNA SUPPORT ARM FOR 75CM SYSTEM	6100283-01	Barrett		
3 ft. TRIPOD	BXI-TR2000	Barrett		
NPRM ( Non-penetrating roof mount) 60cm	BXI-NPRM	Barrett		
Post Kit for 60cm dish	BXI-POSTKIT	Barrett		
NPRM with Post kit for 2 3/8" Mast	BXI-611617401	Barrett		
3' Tripod with pipe - 60cm dish	BXI-3TRIPODPIEB	Barrett		
U-Bolt Assembly	BXI-810-0459	Barrett		
Treated Plywood rought 3/4" x 1' x 1'	Includes \$ 8:00 for cut	Laurentide		
Cement block 8 x 8 x 16		Laurentide		
Insulating Styrofoam 2 in x 2' x 8'				
3' Mastings - 60 cm dish				

STAR CHOICE PARTS				
Tone Generators	TGL100SC	Barrett		
Tone Simulators	TSL-T1225C	Barrett		
Stacked LNB	Stacked LNB	Barrett		
Elliptical Satellite Dish 60cm	Star-60Edish	Barrett		
Twin Stacked LNB for 60CM	6010662-01	Barrett		
Twin Stacked LNB for 75CM	6010663-01	Barrett		
Twin Non Stacked LNB-60CM	6010662-02	Barrett		
Twin Non Stacked LNB-75CM	6010663-02	Barrett		
60cm Elliptical Dish & Quad Feed	STAR60EDQI	Barrett		
75cm Elliptical Dish & Quad Feed	STAR75EDQI	Barrett		
Quad Ellip LNB's-60cm	LM-2738-SC	Barrett		
Quad Ellip LNB's-75cm	LM-2738-75SC	Barrett		
60 cm Ellip dish w/twin stacked LNB's	STAR60ESD	Barrett		
75 cm Ellip dish w/twin stacked LNB's	STAR75ESD	Barrett		
1 Metre Dish	621000103	Barrett		

SWITCHES				
2x2 Multi Switch	2x2-switch	Barrett		
4x4 Multi Switch	4x4-switch	Barrett		
2X4 Multi Switch	BXI-880-5542	Barrett		
5X8 22KHZ OUTDOOR COMMERCIAL MULTI-SWITCH & PS	S-4180-GX	Barrett		



# Approved Parts List

Revised 22-07-03

## EXHIBIT 14.1

## PAGE 5 OF 5

### INVENTORY RE-ORDER FORM – HARDWARE/MATERIAL APPROVED BY STAR CHOICE

Inventory Re-Order Form				
YOU HAVE A CHOICE. <b>STAR CHOICE</b> LA LIBERTÉLÉ.				
<b>ENCLOSURES</b>				
Plastic Enclosures 3" deep	BXI-P136FE	Barrett		
Plastic Enclosures 4.25" deep	BXI-P136FEXT	Barrett		
Weather Enclosure	BXI-P140F81E	Barrett		
TVC enclosure - 3 port, PP, Econo, w/F81- complete	PRI-P136/FE	TVC Comsource		
TVC enclosure - 3 port, PP, Econo, w/F81- Ext lid -complete	PRI-P136/FE-XT	TVC Comsource		
TVC enclosure - standard lid only	PRI-P136/FE-LID	TVC Comsource		
TVC enclosure - Extended lid only	PRI-P136/FE-XT-LID	TVC Comsource		
TVC - Splitter mounting plate	PRI-P136/SMP	TVC Comsource		
<b>MODULATORS</b>				
Modulator Channel	BXI-910-0224-ch(xx)	Barrett		
<b>SURGE PROTECTION</b>				
Surge Protector NP 6 outlets	BXI-810-0796	Barrett		
Surge Protector NP 8 DBS +3	BXI-810-0047	Barrett		
Surge Protector PWR Max 8 DBS+3	BXI-810-0152	Barrett		
<b>ACCESSORIES</b>				
AA Batteries 2per pack	BXI-AABATTERIES	Barrett		
S. Video Cable w/Gold Connector 6'	BXI-810-0099	Barrett		
S. Video Cable w/Gold Connector 12'	BXI-810-0100	Barrett		
Phone Cord Extension to 50' with ends	P70091	Barrett		
Telephone Splitter – 2 way	P70605	Barrett		
Telephone Splitter – 3 way	P70657	Barrett		
Extra Link- IR control device	BXI-810-0170	Barrett		
Cordless Phone Jack	BXI-PX441	Barrett		
Matching Transformers 75-300 Ohm	P-71005	Barrett		

Page 5 of 5



## INSTALLATION HANDBOOK

### 15.0

#### INSTALLATION AND TECHNICAL TIPS FOR THE LEGACY EQUIPMENT INSTALLED PRIOR TO THE QUAD LNB SYSTEMS



## **15.1 GENERAL**

**THIS SECTION IS RESEVED FOR  
INSTALLATION AND TECHNICAL TIPS FOR THE LEGACY EQUIPMENT  
INSTALLED PRIOR TO THE QUAD LNB SYSTEMS**

**UPDATES WILL BE ISSUED ON AN “AS REQUIRED” BASIS**





## **INSTALLATION HANDBOOK**

### **16.0**

#### **ADMINISTRATIVE PROCEDURES AND FORMS “PAPERWORK”**



## **16.1 GENERAL**

The documentation process for the installation of a Star Choice customer is as much a part of an installation as mounting the dish. To provide the customer with the best possible service, all documentation required must be completed and submitted promptly and accurately.

Paperwork may seem unimportant, however Customer service records are developed in the Customer Care Center and they **MUST** reflect exactly what was installed, what programming package the Customer ordered and ultimately the Customer's personal information **MUST** be verified and accurately recorded for billing and future service work. This information must be verified with the Customer Care Center upon completion of the installation.

The current documentation presented is limited, however as time goes on and the need for additional documentation grows it will be added as required via future issues of this section.

The following EXHIBITS outline the documentation and the proper format for their completion and the importance of documenting installation notes.

## **INDEX OF EXHIBITS**

➤ 16-1	Satellite Installation Checklist	Page 5
➤ 16-2	Installation Inspection	Page 6



## **16.2 SATELLITE INSTALLATION CHECKLIST**

Completion of this document is essential to both the Customer and Star Choice to have an accurate record of what they agreed to purchase, what was installed and the terms and conditions of that purchase. It is also essential that the completed work order be legible and returned to Star Choice and a copy left with the Customer.

The information is also used to record installation signal levels that will be used by the Customer Care Center for initial troubleshooting procedures should the Customer call for service problems. It is also used by the Star Choice Supervisor/Inspector on any future dealings with the Customer.

### **Star Choice Reference:**

- Account #.
- Installation Date.

### **Customer Information:**

- Name.
- Address.
- Home telephone number and daytime contact number.

### **Satellite Installation Completion Checklist:**

- Check ALL applicable items pertaining to the installation.
- Ensure the EbNo levels are documented for future reference
- Installer comments. **\*\*\*Refer to Installer Comments on next page\*\*\***

### **Installer & Customer Sign Off:**

- Ensure that the Customer or a responsible person signs-off and also advise the person signing off that **they are also acknowledging the notes documented in the Installer Comments section.**

### **Changes to the Work Order:**

- The Customer may change their mind on the products and service they initially ordered. If the Work Order does not reflect what the customer has agreed to purchase from Star Choice, the changes must be identified on the Satellite Installation Checklist. These changes must be made prior to the Customer signing off.



## **16.2 SATELLITE INSTALLATION CHECKLIST cont'd**

### **Installer Comments**

This is a very important area for the installer. Here, is where the installer can make any notations about the condition of the installation, any damage to property prior to installation or what the Customer would or would not let them do. If this area is not completed and the Customer signed off, the Installer (Star Choice) may be accepting responsibility for any damage reported to Star Choice after the installation

Example 1: Here is where the installer would note that the roof of this home has heavy wind damage and a damaged valley before the install was done. By making this note, the Customer is aware that the roof is in poor shape, and if it leaks in the near future they will know it is not a result of the Star Choice installation.

Example 2: If the installer had to run cable along the side of the house and the Customer did not want to pay to have it buried and told the Installer they would bury it themselves. This would be noted here and signed by the customer to protect Star Choice of any legal action by the Customer should someone trip on the cable and the Customer tries to sue Star Choice for leaving the cable on the ground.

Example 3: There was a partial line-of-sight blockage due to trees and the location of the dish could not be changed and the Customer indicated that they would look after the trimming or cutting down the trees. This will alleviate Star Choice from any responsibility of tree maintenance or moving the dish at Star Choices' expense at a later date.

**Document any issues/concerns at the time of the installation – it does not protect Star Choice if you only advise your Supervisor.**

**These notes MUST be made BEFORE the customer signs the Satellite Installation Checklist accepting the work and acknowledging the Installer Comments. A copy of the completed and signed checklist MUST be left with the customer and advise them that they should retain their copy for future reference.**



## EXHIBIT 16-1

Completed Satellite Installation Checklist

YOU HAVE A CHOICE.



Star Choice Television Network (D.S.) Incorporated  
1 Deerfoot Place, 2924-11th Street N.E. Calgary, AB T2E 7L7  
starchoice.com 1-888-554-star  
fax 1-888-782-7406

Account # 200-12345678Install Date: JAN 27-02.**Satellite Installation Checklist****CUSTOMER INFORMATION** (please print)

Last Name DOE First Name JOHN  
Street Address 45A - WEST ST City TORONTO Province ONTARIO Postal Code L9H - 4H5  
Home Phone Number (416) 123-4567 Daytime Contact Number (905) 789-1011 EXT 401

**INSTALLATION INFORMATION**

BASIC SATELLITE INSTALLATION CONSISTS OF THE FOLLOWING (CHECK ALL THAT HAVE BEEN COMPLETED):

- ☒ Dish assembly and mounting to the Single Family Residential Structure, to the customers satisfaction
- ☒ Alignment of Satellite dish to receive both F1 and E2 signals
- ☒ Cable run from dish to receiver(s), plus connectors
- ☒ Receiver hook-up to one or more televisions
- ☒ Activation of system and programming
- ☒ Permanent phone line connection for Viewers Choice hook-up and activation ( IPPV )
- ☒ Customer orientation on system features and usage
- ☒ Coax Grounding

EbNo Readings in diagnostic "C" (greater than +8)

Anik F1 Channel 344 +10 Channel 345 +10 Channel 390 +10.5 Channel 398 +10.5 Channel 507 +9  
Anik E2 Channel 292 +9.5 Channel 730 +9.5 Channel 820 +10

Installer Comments: CABLE NOT BURIED ACROSS FLOWER GARDEN - OWNER WILL BURY IN SPRING.

**VERY IMPORTANT AREA FOR YOUR NOTES – in this example to explain cables left laying on the ground.**

**INSTALLER & CUSTOMER SIGN OFF**

The Star Choice system has been installed to S.C. installation standards, as outlined above, and is functioning properly

Installer Name: BILL SIMMSCustomer Name: SHELLY DOESignature: Bill SimmsSignature: [Signature]Installer #: 1234Date: 07-2-02





## **16.3 INSTALLATION INSPECTION**

Star Choice is committed to installation excellence and good Customer relations, as this will go a long way in making Star Choice the consumer's 1<sup>st</sup> choice when it comes to choosing their satellite/entertainment provider.

To ensure satellite installations are done to Star Choice standards, Installation Inspectors will be selecting completed installations on a random basis to ensure that Star Choice installation standards and installer conduct are being adhered to.

Exhibit 16-2 is a sample of the inspection form that will be used by the Star Choice Installation Inspector.

### **EXHIBIT 16-2**

#### **Installation Inspection**



# Documentation

Revised 22-07-03

YOU HAVE A CHOICE. <b>STAR CHOICE</b>		<b>INSPECTION REPORT</b>		Firm _____ Installer # _____	
Name _____		Account # _____		Install date _____	
Address _____		City _____		Phone _____	
<b>TECHNICIAN</b>		<b>OK</b>		<b>COMMENTS</b>	
Punctual	<input type="checkbox"/>	<input type="checkbox"/>	TP01	TP02	TP03
Appearance	<input type="checkbox"/>	<input type="checkbox"/>	TA01	TA02	TA03
Knowledge	<input type="checkbox"/>	<input type="checkbox"/>	TK01	TK02	TK03
Equipment	<input type="checkbox"/>	<input type="checkbox"/>	TE01	TE02	TE03
Customer relations	<input type="checkbox"/>	<input type="checkbox"/>	TC01	TC02	TC03
House Keeping	<input type="checkbox"/>	<input type="checkbox"/>	TH01	TH02	TH03
<b>INTERNAL WIRING</b>					
Coax Ground	<input type="checkbox"/>	<input type="checkbox"/>	IG01	IG02	IG03
Connectors	<input type="checkbox"/>	<input type="checkbox"/>	IC01	IC02	IC03
Telco Connection	<input type="checkbox"/>	<input type="checkbox"/>	IT01	IT02	IT03
Route of Cable	<input type="checkbox"/>	<input type="checkbox"/>	IR01	IR02	IR03
Fastening Cable	<input type="checkbox"/>	<input type="checkbox"/>	IF01	IF02	IF03
<b>DISH</b>					
Grounding	<input type="checkbox"/>	<input type="checkbox"/>	DG01	DG02	DG03
Mount & Assembly	<input type="checkbox"/>	<input type="checkbox"/>	DM01	DM02	DM03
Weather proofing	<input type="checkbox"/>	<input type="checkbox"/>	DW01	DW02	DW03
Location	<input type="checkbox"/>	<input type="checkbox"/>	DL01	DL02	DL03
<b>EXTERNAL WIRING</b>					
Coax ground	<input type="checkbox"/>	<input type="checkbox"/>	EG01	EG02	EG03
Weather proofing	<input type="checkbox"/>	<input type="checkbox"/>	EW01	EW02	EW03
Connectors	<input type="checkbox"/>	<input type="checkbox"/>	EC01	EC02	EC03
Route of Cable	<input type="checkbox"/>	<input type="checkbox"/>	ER01	ER02	ER03
Fastening Cable	<input type="checkbox"/>	<input type="checkbox"/>	EF01	EF02	EF03
Comments					
Follow up required <input type="checkbox"/>					
Inspected by: _____ j.r _____ Date _____ 1/9/03					
Deficiency repaired by : _____ Date _____					



## INSTALLATION HANDBOOK

### 17.0

#### COMPLETION WORK CODES FOR INSTALLS AND SERVICE



## 17.1 GENERAL

The following "CNT Codes" will be used by ALL installers when completing the Work Orders that have been assigned.

### EXHIBIT 17-1

## **CNT Codes - Service**

<u>WORK ORDER</u> <u>CNT CODES</u>	<u>PRIMARY</u>
---------------------------------------	----------------

010	New install
011	New install (MDU)
030	Cold connection
040	Add service - Wire additional outlet/relocate & install receiver
041	Add service - Install additional receiver (HDD Decoder)- already wired
043	Add service - upgrade dish/antennae
060	Minus service - Disconnect - pick up receiver - dish
051	Minus service - Receiver only
061	Minus service - Moving disconnect (within bldg)

<u>CNT CODE</u>	<u>SECONDARY (Upgrades)</u>
-----------------	-----------------------------

210	Add service - wire addition outlet/relocate & install receiver
211	Add service - install additional receiver (already wired)
214	Add service - hook up IPPV
215	Add service - install IPPV jack over 25'

<u>CNT CODE</u>	<u>Incomplete Reasons</u>
-----------------	---------------------------

921	Customer Cancelled by Phone
922	No Line of Sight
923	Nobody Home
924	Incomplete- Due to Sales Issue
925	Incomplete- Due to Letter of Permission
926	Incomplete - Installed by Others
927	Customer Cancelled at Door
928	Incomplete-Customer rescheduled
929	Incomplete - Installer rescheduled
930	Incomplete- 40 ft Ladder required
931	Incomplete- Wrong Customer Information
932	Incompleted - Metro Townshousing complex

**\*\*Please be advised, only one Primary Code can be used per site visit.**



## 17.2 GENERAL

The following "CNT Codes" will be used by ALL installers when completing the Service Orders that have been assigned.

### EXHIBIT 17-2

## CNT Codes - Service

CNT Code	<u>PRIMARY</u>
----------	----------------

410      Service call - 1st Hour

	<u>SECONDARY</u>
--	------------------

420      Service call - every additional hour after 1st Hour

Fault Found Code	Code Description
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359	NO ACCESS
400	NOBODY HOME
401	FAULTY TONE GEN/TONE SIM
402	FAULTY RECEIVER
403	IMPROPER HOOK-UP
404	FAULTY LNB
405	FAULTY CONNECTOR/SWITCH/SPICE
406	FAULTY WIRING INTERNAL OR EXTERNAL
407	FINE TUNE DISH
408	CUSTOMER EDUCATION OR CUSTOMER FAULT
409	IMPAIRED LINE OF SIGHT (relocate-resolve
411	CUSTOMER CANCELLED (PRIOR TO CALL/CANCEL
411	MISCELLANEOUS
413	COMPLETE BUILDING OUTAGE
414	NO ACCESS
415	OUTAGE CAUSED BY OTHERS
416	No line of sight (no resolution)





## **INSTALLATION HANDBOOK**

### **18.0**

**THIS SECTION RESERVED FOR PLEX  
CONSTRUCTION REFERENCE MATERIAL**



# ***Marketing and Sales Promotions***

Issued 5/12/02



## **INSTALLATION HANDBOOK**

### **19.0**

**THIS SECTION RESERVED FOR THE INSTALLER  
TO FILE MARKETING AND SALES PROMOTIONS  
FOR FUTURE REFERENCE**



## **INSTALLATION HANDBOOK**

### **20.0**

**THIS SECTION RESERVED FOR THE INSTALLER  
TO FILE TECHNICAL BULLETINS, NOTICES,  
MODIFICATIONS, ETC.**